

ABSENCE MAKES THE HEART GROW FONDER, BEHAVIORS ADAPTIVE AND  
PERCEPTIONS IDEALIZED: THE EFFECTS OF GEOGRAPHIC SEPARATION AND  
INTERPERSONAL MEDIA ON INTIMACY PROCESS

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Many people assume that it is challenging to maintain a romantic relationship when the partners are separated by a considerable distance. Recent research on long-distance relationships, however, suggests that long-distance romantic relationships are equally or even more intimate and satisfied than geographically close counterparts. The present study examined whether the everyday intimacy process unfolds differently in long-distance versus geographically close dating relationships and whether the use of interpersonal media interplays with geographic separation to affect intimacy in specific interactions. Drawing on the Interpersonal Process Model of Intimacy (IPMI; Reis & Shaver, 1988), the study tested an intimacy enhancement mechanism in which long-distance couples engage in more adaptive self-disclosure behaviors and form more idealized relationship perceptions than do geographically close couples for the pursuit of intimacy across various interpersonal media. These predictions were examined with a novel electronic diary method. Long-distance and geographically close dating couples completed a 7-day diary study in which both members of the couple independently reported their interactions that took place each day. The results provide support for the behavioral adaptation and perceptual idealization effects proposed, and suggest that the two effects vary along the media dimensions of cue multiplicity, synchronicity and mobility. These findings offer a contextual extension to the IPMI and advance the understanding of communication and relational processes in long-distance and mixed-mode relationships.

## BIOGRAPHICAL SKETCH

Li Crystal Jiang is originally from Guangxi, China. She attended Peking University for her undergraduate education in Advertising with a minor in Economics. Prior to pursuing her doctoral degree at Cornell, she earned a MPhil degree in Communication Studies at Hong Kong Baptist University. Her research focuses on interpersonal dynamics in technologically-mediated communication and health communication with an emphasis on the interpersonal processes that shape the course and conduct of personal bonding, self-presentation, persuasion, and trust.

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## CHAPTER 1

### INTRODUCTION

Close relationships maintained across geographic distance are fairly common nowadays due to increasing mobility of the society and widespread adoption of new communication technologies (Larsen, Urry, & Axhausen, 2006; Walther & Parks, 2002). Even romantic relationships that are normally characterized by physical proximity are often carried out in geographic separation due to factors such as educational and dual-career pursuits, military deployment, and immigration (Stafford, 2005). It is estimated that about 3 million married people in the United States live apart from their spouses for reasons other than divorce or discord (Bergen, Kirby, & McBride, 2007). This number is steadily growing in recent years, and is likely a conservative estimate given that unmarried committed couples and homosexual couples who live apart are not included. The prevalence of long-distance is also high for dating relationships. About 25 to 50% of college students are currently dating a long-distance partner, and up to 75% have engaged in long-distance relationships at some point while in college (Aylor, 2003; Dellmann-Jenkins, Bernard-Paolucci, & Rushing, 1994; Guldner & Swensen, 1995; Knox, Zusman, Daniels, & Brantley, 2002).

The prevalence of long-distance relationships, however, has not been well reflected in communication or other social science studies (Stafford, 2005; Wood & Duck, 1995). This domain is poorly understood, from a practical aspect, partly because of various research challenges, from recruiting participants to collecting data over time and across space. But more importantly, the topic of long-distance relationships is understudied because of its marginalized status in traditional relationship research. Studies of interpersonal relationships and social networks have implicitly assumed that close relationships are also “close” in the spatial sense,

and hence emphasize the vital roles of physical proximity and face-to-face (FtF) communication in interpersonal processes (Larsen et al., 2006).

This primacy of co-presence has also been reinforced by some cultural values about romantic relationships especially marriages (Stafford, 2005; Sahlstein, 2010). For example, the public firmly believe that geographical proximity and frequent FtF contact are necessary for developing mutual understanding, shared meanings and emotional attachment in dating, and married couples are supposed to share the same residence. Scholars also similarly argue that time spent together and the amounts of daily talk are global indicators of relationship satisfaction (Duck, Rutt, Hurst, & Strejc, 1991; Richmond, 1995; Vangelisti, 2002). Long-distance relationships obviously stand in contrast to these assumptions, and consequently are viewed as abnormal or atypical relational states. The lack of physical proximity and deficits in communication have led to the expectation that it is particularly challenging to maintain a long-distance relationship relative to a geographically close one. As a consequence, long-distance relationship studies have mainly focused on the problematic aspects of relating, such as uncertainty, distress, instability and coping strategies (e.g., Dainton & Aylor, 2001; Holt & Stone, 1988; Lydon, Pierce, & O'Regan, 1997; Westefeld, & Liddell, 1982).

Until two decades ago, the research on close relationships had been almost exclusively focused on relationship processes in geographically close situations. However, major advances in information and communication technology have encouraged rethinking the privileged position of physical proximity in theories concerned with relationship development. Extensive empirical testing has led to the consensus that interpersonal relationships can be initiated and maintained at a distance or in mixed-mode contexts through a constellation of communication technologies (see Walther & Parks, 2002, for a detailed review). A recent nationwide survey conducted by the

Pew Internet & American Life Project (Hampton, Sessions, Her, & Rainie, 2009) shows that Americans take advantage of landline and cell phone, email, text messaging (also known as short message service), instant messaging (IM) and social networking to maintain both distant and local core ties. In particular, email, social networking, and text messaging promote “glocalization” because they are used as frequently to maintain local ties as they are used to maintain distant ties (Hampton & Wellman, 2003).

Heavily influenced by this paradigm shift, research in the last decade has ceased considering geographic separation as a negative event. The limited but growing research has paid predominant attention to dating relationships with an emphasis on relationship maintenance (Aylor, 2003; Guldner, 1996; Paul, Poole, & Jakubowyc, 1998). Studies mostly define long-distance status as romantic partners unable to see each other face-to-face on a daily basis due to geographical distance, and approach long-distance (hereafter referred to as LD) dating relationships by comparing them with geographically close (hereafter referred to as GC) ones along a variety of relationship features. Counter-intuitively, studies consistently reveal that although having much less FtF communication, LD couples are not necessarily less satisfied with their relationships compared to GC couples (Dellmann-Jenkins et al., 1994; Guldner & Swensen, 1995; Holt & Stone, 1988), and some studies even show that LD couples self-reported higher levels of relationship satisfaction, stability and trust (for a review, see Maguire & Kinney, 2010). Scholars reason that LD dating relationships are not uniformly or inherently problematic (Dainton & Aylor, 2002; Sahlstein, 2010; Stafford, 2005); it is more likely that some specific individual or relationship characteristics (e.g., high uncertainty about a relationship’s future, high attachment anxiety) contribute to distressful and unsatisfied relationships (Maguire, 2007; Pistole, Roberts, & Chapman, 2010).

Researchers have also contrasted other relational dimensions across two relationship types and attempted to examine how they affect relationship quality and stability. These dimensions include usage of interpersonal media (e.g., Dainton & Aylor, 2002), maintenance strategies (e.g., Carpenter & Knox, 1986; Pistole et al., 2010), coping mechanisms (e.g., Holt & Stone, 1988), and cognitive bias (e.g., Stafford & Merolla, 2007). Such comparisons have provided a compelling picture of diverse forms of differences between LD and GC dating, and also suggested that geographic separation shapes the communication goals LD couples want to achieve and give rise to corresponding adaptations of thoughts and behaviors that potentially stabilize the relationship. For example, scholars reason that LD couples often have a high desire for intimacy, which further motivates idealization in relationship cognitions and behavioral adaptation in communication (Stafford & Merolla, 2007; Stafford, 2010). Idealized representations of romantic partners and relationships are likely to emerge from restricted communication, and are further strengthened by the motivated elaboration that the LD relationship should be worth all the high maintenance investments. LD couples also tend to enact intimacy enhancement adaptation to compensate for the restricted communication. In mediated communication, they engage in more intimate talk, more selective self-presentation, and more avoidance of conflicts and taboo topics in mediated interactions (Stafford, 2010), and when they see each other in person, they seek to spend quality time together and form good memories (Carstensen, Isaacowitz, & Charles, 1999; Sahlstein, 2004; 2006).

Whereas previous studies have yielded significant differences between LD and GC dating in terms of high-level communication patterns and relationship qualities, few studies have specifically looked at how cognitive and behavioral processes operate in daily partner interactions to produce positive relational outcomes such as intimacy. Previous research instead

has relied primarily on global, cross-sectional self-reports. Such an approach neglects the dynamic nature of daily interactions among dating couples, and cannot sufficiently capture important daily experiences, such as everyday talk and interaction proclivities (Stafford, 2010). An alternative to investigating LD relationship dynamics, as Rohlfsing (1995) notes, is to scrutinize how relational partners actually think, feel, and act about and with one another (p.194).

Instead of taking static snapshots across two relationship types as most past research has done (Sahlstein, 2010), the present study focuses on how the intimacy process in LD and GC dating operates on an interaction-by-interaction basis with a novel web-based diary method. Adapting the Interpersonal Process Model of Intimacy (IPMI; Reis & Shaver, 1988) as a theoretical framework, the study specifically examines the roles of disclosure (by self and by the partner) and perceived partner responsiveness in generating intimacy for both dating groups. The study also attempts to validate and replicate the relational positivity of LD dating observed in previous survey studies on the daily intimacy experiences. If LD couples do experience greater intimacy in specific interactions, what are the contributing communication and relational dynamics? Drawing on the previous work on behavioral adaptation and perceptual idealization (Stafford & Merolla, 2007; Stafford, 2010), the current study specifically proposes and tests an intimacy enhancement process in which LD daters strategically adapt their self-disclosure behaviors and orient their relationship perceptions to enhance daily intimacy experiences using a range of interpersonal media.

An important aim of the present study is to explore how the use of communication technology is involved in the intimacy enhancement process and contributes to the maintenance of relationships in mixed-mode communication. Previous CMC (computer-mediated communication) research has heavily focused on relationship initiation in exclusively online

contexts (e.g., start a friendship or romantic relationship online; see Walther & Ramirez, 2009); however, relationship initiation is not the major motive that drives people's interpersonal use of communication technologies (Ramirez & Broneck, 2009). For romantic relationships, only 3% of the Internet users indicated that they met their partners online (Madden & Lenhart, 2006); "cyber emigrant relationships" in which partners first meet offline and then start maintaining the relationship via a variety of interpersonal media (Rabby, 2007) are of greater typicality.

Most of the existing CMC research has explicated the intimacy processes in one single CMC medium (e.g., social networking, online dating, and IM) or in comparisons of two media (e.g., text-based vs. FtF) (see for a review, Walther, 2010). Such a limited scope has led researchers to question the predictive validity of traditional CMC theories in the mixed-mode dating interactions, in which couples communicate through many different channels in a given day (e.g., phone, IM, text messaging, videoing). For example, Ramirez and Wang (2008) challenge the Hyperpersonal model by arguing that shifting from leaner, text-based interactions to richer, multimodal FtF interaction may dilute or disconfirm the hyperpersonal states as visual and aural cues become available for reevaluating the impressions. Parks (2009) suggests that communication research needs to understand how people establish relationships in a mixed-mode setting, especially how they make, interpret, and manage each other's media choices on a daily basis. Such understanding will not only enrich CMC theories, but will also have important design implications.

This dissertation begins with an introduction of the Interpersonal Process Model of Intimacy (IPMI) in Chapter 2, which presents a framework for the intimacy dynamics in close relationships. Chapter 3 proceeds to review the previous literature on LD dating relationships with an emphasis on the conceptualization and key characteristics of LD relationships. The

chapter further proposes the need to enhance intimacy as a highly salient goal in LD dating, and discusses how geographic separation and interpersonal media interplay to affect the intimacy enhancement process. The review of literature is followed by a set of hypotheses that address 1) the general intimacy process in both LD and GC dating, 2) the effects of geographic separation on intimacy enhancement, and 3) the effects of interpersonal media on intimacy enhancement.



## CHAPTER 2

### INTIMACY AS AN INTERPERSONAL PROCESS

#### Importance and Conceptualization of Intimacy

*Intimacy* and its synonyms (e.g., closeness, affection) are some of the most frequently appearing keywords in the interpersonal communication literature. As a significant relational phenomenon, it spans several relational processes, such as attachment, self-disclosure, communal sharing, and social support, and manifests itself through both verbal (e.g., verbal disclosure) and nonverbal behaviors (e.g., physical touch, sexual encounters) (Prager & Roberts, 2004).

Research has shown that intimacy is a crucial dimension of personal relationships, especially romantic relationships, and usually signifies relationship health. Although relational intimacy and relationship satisfaction are not isomorphic, relational intimacy is considered an important component of relationship satisfaction (Lippert & Prager, 2001). It has been well documented that relational intimacy is positively associated with relationship satisfaction and stability in marriages and dating relationships (Greeff & Malherbe, 2001; Hill & Peplau, 1998; Larson & Holman, 1994; Talmadge & Dabbs, 1990). The lack of intimacy is one of the most damaging problems and usually paves the way for relationship distress, dissatisfaction and ultimately dissolution (Duck & Wood, 2006; Greenberg & Johnson, 1988; Hendrick, Hendrick, & Adler, 1988; Simpson, 1987; Whisman, Dixon, & Johnson, 1997). Intimate relating, on the other hand, plays a crucial role in understanding the inner aspects of the other (e.g., experience, habits, routines, private thoughts and beliefs and sexual fantasies) and the self in relation to the other (e.g., relational knowledge; Prager & Roberts, 2004). Such an understanding is further stored as relationship schemas (internal relationship representation) to guide future interactions (Baldwin, 1992; Markus & Kunda, 1986).

Intimacy is a complex concept that has been conceptualized in various ways throughout the literature (Perlman & Fehr, 1987). The conceptual diversity is reflected in the levels of analysis, temporal aspects and central components (Laurenceau, Rivera, Schaffer, & Pietrononaco, 2004). First, intimacy has been viewed as an individual disposition (willingness to commit to a relationship, ability to share at deep personal levels, and capacity to communicate inner thoughts and feelings; Erikson, 1963), a positive state of interactions (a momentary feeling of being physically or psychologically close; Prager, 1995), and a desired characteristic of a dyad (high levels of mutual understanding and interdependence; Prager & Roberts, 2004).

While earlier conceptualizations tend to frame intimacy as a feature within the relationship, more recent research treats intimacy as a dyadic and interdependent relating process whereby intimate relationships develop through enduring interactions over time (Acitelli & Duck, 1987; Cordova & Scott 2001; Reis & Shaver, 1988). In addition, some conceptual definitions of intimacy consider the forms of intimacy (e.g., intimacy in affection, cognition, physicality and mutuality; Moss & Schwebel; 1993), whereas other accounts emphasize the nature of intimacy as the positive relating of two inner selves (e.g., self-exposure, positive involvement, shared understanding; Prager & Roberts, 2004).

This dissertation adopts a process-oriented conceptualization of intimacy given its focus on couples' specific interactions and mutual influence over a period of time. Following the conceptualization in the Interpersonal Process Model of Intimacy (Reis & Shaver, 1988), intimacy is defined as a personal, subjective sense of connectedness derived from an interpersonal, transactional process consisting of self-disclosure and partner responsiveness. The following section provides a comprehensive review of the central tenets of the IPMI.

### *Interpersonal Process Model of Intimacy (IPMI)*

The IPMI (Reis & Patrick, 1996; Reis & Shaver, 1988) largely attends to how intimacy develops in a specific intimate interaction (see Figure 1), with a temporal notion that intimacy accrues or erodes through ongoing communication between relationship partners, with repeated interactions over time (see Figure 2).

Intimacy is defined as an interpersonal, transactional process with two principal contributors: *self-disclosure* and *perceived partner responsiveness*. Self-disclosure refers to any expression that reveals personally relevant information, thoughts, and feelings (Derlega, Metts, Petronio, & Margulis, 1993). The disclosure can be conducted either verbally (e.g., ‘I feel upset today’) or nonverbally (e.g., opening arms for a hug) (Keeley & Hart, 1994). Self-disclosure has traditionally been considered as an important index of intimacy and relationship development more generally (Altman & Taylor, 1973; Sprecher & Hendrick, 2004). Being self-revealing indicates an invitation to the other to understand personal aspects of the self, and the achieved shared understanding generates a sense of connectedness. Deeply self-revealing behaviors, normally characterized by disclosures of emotions and other innermost self aspects, are more closely related to experiencing intimacy than disclosures of facts and thoughts (Morton, 1978).

Perceived partner responsiveness, the new theoretical component introduced by the model, is defined as the perception that the partner’s communication behaviors orient towards the core needs of self (Reis, Clark, & Holmes, 2004). Its conceptualization includes three components, namely understanding, validation and caring. Understanding involves communicating awareness and recognition of the facts, thoughts, and feelings disclosed, usually manifested by content relevant, well-timed responses (Reis et al., 2004); validation conveys acceptance and appreciation of the discloser and the thoughts and feelings being disclosed;

caring expresses emotional concerns and willingness to support the discloser's needs or problems (Maisel, Gable, & Strachman, 2008; Mitchell et al., 2008). A responsive expression from the partner generates the feelings of "having chemistry" and "being understood", better copes the distress and uncertainty the person who just disclosed (termed as discloser) may have, and hence facilitates the development of intimacy. A response that expresses disinterests to the disclosure or fails to address the needs of the self, in contrast, may downgrade the discloser's self-worth and create subsequent distancing behaviors.

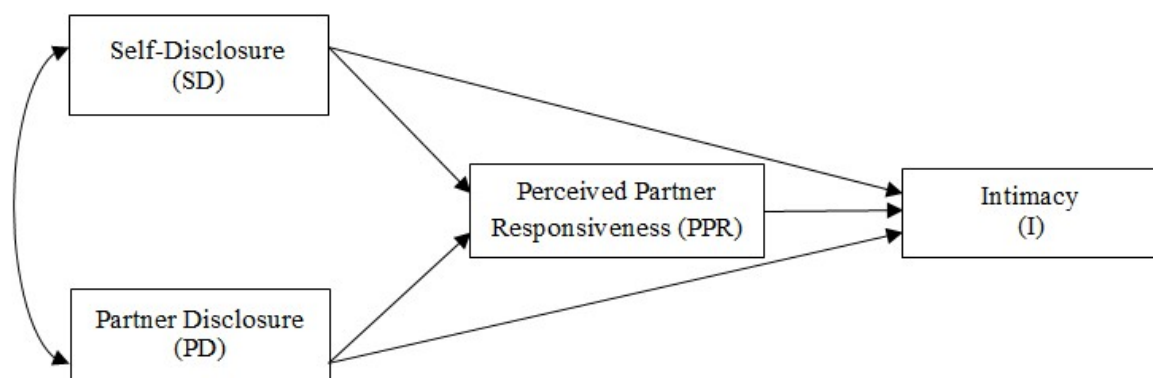


Figure 1 Interpersonal process of intimacy on the interaction level (IPMI; Reis & Shaver, 1988.)

The intimacy process is initiated when one reveals personally relevant information, thoughts and feelings to his or her partner (disclosure act). The intimacy process continues when the partner emits responses that address the specific content of the disclosure and conveys understanding, validation and caring for the discloser (responsive act). More importantly, for the discloser to experience intimacy, the responsive act has to be subjectively perceived, that is, the discloser feels understood, validated and cared for in the interaction (perceptual act). Relationship satisfaction and general relational expectation may bias the perceptions such that individuals still tend to interpret the responses in color with their expectations even when the

partner responds in a discrepant manner (either more responsive or less responsive than expectations). For instance, false alarms may occur when the unresponsive behaviors are still interpreted as responsive (e.g., a purchase for one's own interests is considered as a gift) in a satisfied relationship (a halo effect driven by relationship satisfaction), and these false alarms even increase relationship well-being in short terms (Gable, Reis, & Downey, 2003). By contrast, misses (enacted support is not perceived) and misinterpretation (e.g., an intended caring is perceived as happening by chance) are more likely observed among distressed couples because the couples start the judgments with an unresponsive assumption.

The whole intimacy process is a sequential unfolding of the disclosure, responsive, and perceptual acts. The experience of intimacy occurs when self-disclosures are responded to responsively, whereas a breakdown in the process decreases the experience of intimacy (Reis & Patrick, 1996). The discloser's perception of the partner's responsiveness is a determinant for intimacy above and beyond the actual communication (e.g., self- and/or partner disclosure). The model predicts that the extent to which the discloser perceives the partner as responsive is the most proximal predictor of intimacy, and mediates the association between both partners' disclosures and level of intimacy in the interaction (see Figure 1).

#### *Temporal Aspect of Intimacy Process.*

As mentioned earlier, the IPMI conceptualizes intimacy as a dyadic and interdependent process whereby two partners mutually affect the development of intimacy (Kelly et al., 1983; Reis, 2007). As discussed above, interdependence means *behavioral dependence*: partner A's self disclosure influences partner B's responses and behaviors, which then influences partner A's further behaviors, and so on. Moreover, behaviors and relationships are interdependent such that self-disclosure (and also responsive behaviors) transforms the nature of the relationship and the

nature of the relationship transforms the meaning and the consequences of the self-disclosure (Derlega et al., 1993, p.11). For example, intimate disclosure behaviors lead to high levels of intimacy and cultivate perceptions of security (Guerrero & Andersen, 1991), which in turn increase willing to enact openness in communication (Knobloch & Solomon, 2002).

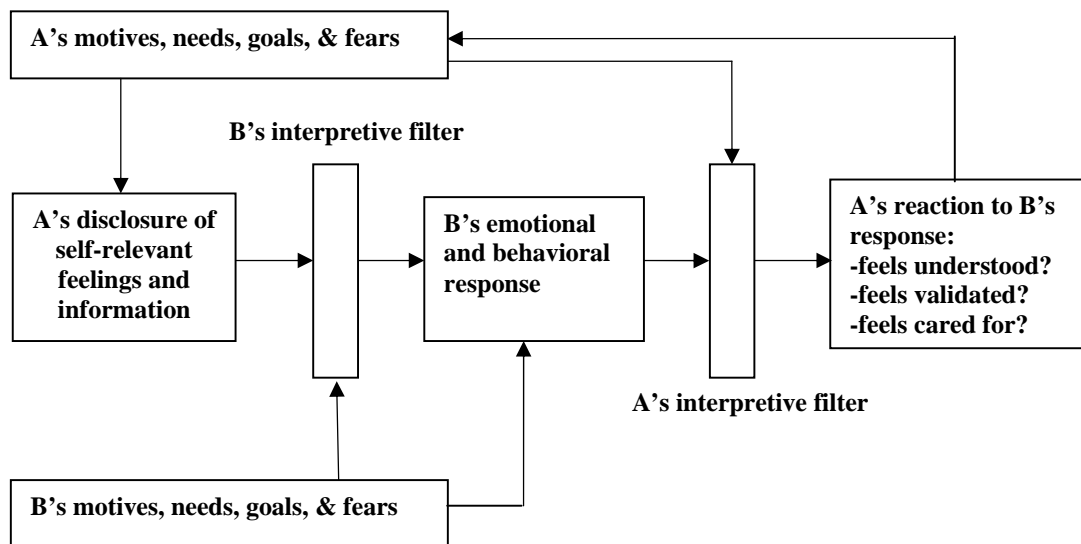


Figure 2 The temporal aspect of the IPMI (Reis & Shaver, 1988, p. 375).

The IPMI also incorporates this mutual transformative process and describes how individuals' relational schemas (e.g., relational motives, needs, goals, and expectations) influence how they behave toward their partners, which in turn is interpreted and responded to by their partners on the basis of the partners' own relational schemas (Figure 2; also see Reis & Patrick, 1996). Both partners' relational schemas influence the intimacy process by moderating the degree to which they self-disclose and respond to partners (Laurenceau et al., 2004). Previous research has extensively shown that, although not necessarily within the framework of IPMI, individuals' motives and goals influence the tendency to self-disclose and respond. For example, the pursuit of reducing uncertainty in the acquaintance stage is associated with frequent and in-depth self-disclosures (Altman & Taylor, 1973) and the goal of self-presentation often promotes

strategic regulation of self-disclosures (Schlenker & Pontari, 2000). Crocker and Canevello (2008) indicate that compassionate goals lead to greater responsiveness in behaviors relative to self-image goals.

Besides affecting disclosure and responsive behaviors, each partner's motives, needs, and other relational schemas also function as *interpretative filters* to moderate the degree to and the way in which the partners perceive others' behaviors. As noted earlier, responsiveness perception is not always consistent with the actual behavior intended. The discloser may interpret a response in a variety of ways, as an expression of intimacy, an odd statement, or a casual greeting, depending on whether this person seeks for connectedness (Laurenceau et al., 2004, p.65). If the discloser desires being psychologically close with the partner, with such an "intimate" mindset activated, he or she is likely to interpret the partner's messages as responsive.

#### *Empirical Testing of the IPMI Framework.*

The IPMI has been tested in the interactions among friends, romantic partners and married couples in a couple of diary and experimental studies (see Laurenceau et al., 2004, for a review). The key prediction that perceived partner responsiveness mediates the effect of self-/partner disclosure has been largely supported. Studies also indicate greater mediation effects for females than for males, and greater effects for married couples than for general relationships (Laurenceau, Barrett, & Pietromonaco, 1998; Laurenceau, Barrett, & Rovine, 2005), although more diversified samples and meta-analysis are needed for solid conclusions. Previous studies have tested the model over a different length of time (ranging from a week to 6 weeks), and have showed that the model significantly captures the intimacy process on an interaction-by-interaction basis (Laurenceau et al., 1998; Lippert & Pragger, 2001). Another theoretical orientation in extending this model aims to identify factors that moderate disclosure and

responsive behaviors and/or function as interpretative filters. Empirical testing has also identified several individual or relationship sources as such factors, such as attachment style (Grabill & Kerns, 2000) and relational goals (Canevello & Crocker, 2010).

However, few studies have looked at how contextual factors affect the intimacy process, such as geographical distance and the interpersonal media in which interactions may take place. Previous studies primarily test the intimacy process with geographically co-present partners, assuming FtF interactions are the primary way for communicating intimacy. The present study aims to address these gaps, and the following chapter presents the work related to the intimacy process in long-distance dating and discusses how distance and interpersonal media may influence the theoretical components and relational processes described in the model.



### CHAPTER 3

#### RELATIONAL COMMUNICATION IN LONG-DISTANCE DATING

##### *Defining a Long-Distance Romantic Relationship*

How do we define an LD romantic relationship? This has never been an easy question to answer. Throughout the literature, most studies adopt the binary conceptualization and categorize relationships as either GC or LD based on physical geography, but there is a lack of consensus on the cutting point across time and space (Merolla, 2010). Some earlier studies use the geographic distance separating residences as the criterion, however, the exact number of miles varies, ranging from at least 50 (Schwebel, Dunn, Moss, & Renner, 1992), 100 (Carpenter & Knox, 1986) to 200 miles or more (Lydon et al., 1997; Knox et al., 2002). Similarly, some other studies use telephone area codes (Cameron & Ross, 2007) or names of residential city (Helgeson, 1994) to verify LD status. The commuter marriage literature considers days of non-copresence and has defined LD status as the partners spending at least two (Bunker, Vanderslice, & Rice, 1992; Holmes, 2004), three (Bergen et al., 2007), or four (Rabe, 2001) nights apart per week. Nonetheless, such fixed criteria are often problematic (Pistole & Roberts, 2011): first, relationship types vary in the expectation of being separated and fixed cutting points lead to misclassification. For instance, a husband who travels more than 200 miles weekly for business trips may still consider the relationship as GC, whereas dating couples living more than 200 miles apart are more likely to categorize the relationship as LD. Second, the relationship features vary widely not only across but also within relationship types (Merolla, 2010). Couples who live 50 miles apart and who live in two different countries may both identify as LD, but Holt and Stone (1988) indicated that midrange LD couples (i.e., living less than 250 miles apart) are more similar to proximal couples than couples who hardly visit each other (e.g., living in different

countries). LD relationships also vary drastically in terms of reasons for separation. Besides separation driven by dual educational and professional pursuits – which has been extensively documented in previous literature – couples can also be separated for military deployment, incarceration, and illegal migration. These types of separation are all categorized as LD, but partners in these relationships substantially differ from college students or commuters who visit their partners over weekends and freely communicate through a constellation of communication technologies. In contrast, soldiers, prisoners and immigrants have very infrequent FtF contact and limited CMC access with their loved ones (Bell & Schumm, 1999), and usually face certain threats of harm that increase uncertainty, distress and negative emotionality.

Studies of dating relationships often ask participants to self-define their LD status. Participants are presented with forced-choice questions, such as “I consider my relationship to be a long-distance/commuter relationship” (Van Horn et al., 1997, p. 27), “my partner lives far enough away from me that it would be very difficult or impossible for me to see him or her every day” (Guldner & Swensen, 1995, p.316), and “able/unable to see each other, face to face, on a frequent basis due to geographical separation” (Dellmann-Jenkins et al., 1994, p. 214). Stafford (2005) recommends self-defining over using fixed criteria because subjective relational reality better captures relational states than imposed standards. A recent validity examination of various LD romantic relationship indices (Pistole & Roberts, 2011) has empirically confirmed that the self-definition was convergent with the expert rated LD status. The forced-choice self-report item (I consider my relationship to be a long-distance relationship) was the most valid measure of LD status, followed by self-reported distance and residential measures (living 25 miles or more away, very difficult or impossible to see each other daily, residing in different cities). Therefore, the present study also adopts this self-defining criterion and defines an LD

relationship as romantic partners unable to see each other, FtF, on a daily basis due to geographical separation (Dellman-Jenkins et al., 1994).

### *Long-Distance Dating Relationships*

Dating relationships differ significantly from marriage, friendship, and other types of close relationships (Sternberg, 1986). Serious dating (also known as courtship) operates as a mate selection process, aiming to figure out whether two individuals are suited and develop interdependence via active personal and relational knowledge seeking. The depth of interdependence and shared understanding has been a consistent predictor for later marriage stability and satisfaction (Larson & Holman, 1994). Dating couples are urged to develop deeper relational knowledge, reconcile personal differences, and decide whether to maintain, improve or just terminate the relationships in partner interactions (Stafford & Reske, 1990).

Research has suggested that the transition from causal dating to a more emotionally attached, mutually recognized, and interdependent state is challenging (Solomon & Knobloch, 2001). In particular, the dating partners have to handle relational uncertainty, which usually arises from unpredictable or ambiguous relationship situations, inconsistent or unavailable person information and insecure states of relational knowledge (Brashers, 2001). Different from the uncertainty about partners' personality characteristics explicated in the uncertainty reduction theory (Berger & Calabrese, 1975), relational uncertainty focuses on the dyad as a unit, and reflects doubts about criteria for appropriate behaviors, mutual understanding and interdependence between partners, or the future of the relationship (Knobloch & Solomon, 1999). One key coping strategy for partners to manage relational uncertainty is through open communication with their partners, such as interrogation, self-disclosure and seeking for responsiveness (Berger & Kellermann, 1994).

The dating relationships maintained across distance face a much more challenging transition process. Previous research has identified three essential and interrelated differences between LD and GC dating that can potentially affect how intimate relating operates at a distance, as detailed below.

*Restricted communication.* A first important difference between LD and GC dating, also the most obvious one, is the limited opportunity for communication especially FtF communication. LD couples spend much less time together FtF and most relating is conducted while the couples are apart via mediated communication. One study that compared media usage across the two types of relationship reveals that the numbers of phone conversations, email exchanges and chat sessions did not differ between LD and GC couples (Stafford & Merolla, 2007), suggesting that LD couples have less overall communication than GC couples.

*Low level of interdependence.* The extent to which two partners are dependent on each other can reflect how close they are. One important consequence of limited FtF contact is that it greatly reduces the reliance upon each other in various relational or non-relational tasks on a day-to-day basis (Rusbult & Van Lange, 2003; Stafford, 2010). For example, one may feel less dependent on his or her LD partner because the LD partner is likely absent from the daily enjoyable times and also because they do not share routine activities such as grocery shopping and driving to work.

*Heightened relational uncertainty.* The limited communication and awareness of low interdependence are likely to increase relational uncertainty (Emmers & Canary, 1996; Lydon et al., 1997; Maguire, 2007). Although every dating couple has to handle relational uncertainty that arises from the process of getting to know each other, this challenge gets pronounced in LD dating. LD couples may question the quality of future prospects of the relationship and the high

investment for maintaining the relationship. Stafford (2005) also points out that the heightened relational uncertainty is also derived from the cultural norm of intimate relating that physical proximity contributes to relationship longevity. However, it should be noted that relational uncertainty is not uniformly high among LD daters. It depends on LD partners' appraisals of future reunion. Living in the same city is not the default preference in LD dating relationships, and actually a subset of people may actively seek out an LD state in which they have both romantic love and autonomy (Fitzpatrick, 1988; Levin, 2004; Levine & Trost, 1999).

Indeed, restricted communication, reduced interdependence and heightened relational uncertainty are unfavorable states of intimate relating, and impose constraints for the maintenance of LD relationships. However, it is also unlikely for lovers to leave the annoying situation as it is. As Interdependence Theory (Kelley, 1997; Kelly & Thibout, 1978) points out, interpersonal goals can be achieved by selecting situations and/or by transforming the situations. When the choice of situations is constrained by the geographic distance (e.g., individuals cannot see their beloved ones whenever they want), the needs for personal bonding are largely fulfilled by the transformation of situations whereby individuals develop adaptation routes via repeated experiences in similar situations and act upon the subjective perceptions that arise from the adaptation. LD couples are likely to transform the frustrating LD relating to a more favorable state by adapting their communication behaviors and orienting their relational cognitions in situation-relevant manners. To illustrate this point, the following section articulates how the three challenges in LD dating, namely restricted communication, reduced interdependence and heightened relational uncertainty, can activate behavioral and perceptual adaptation routes to enhance intimacy.

### *Intimacy Enhancement in Long-Distance Dating*

As noted earlier, with the criteria of maintaining relationships, LD dating relationships are as successful if not more so than GC ones with regard to relationship stability, commitment and satisfaction (for a review, see Stafford, 2005, p.32). Importantly, the equal or higher relationship qualities in LD dating are apparently not driven by the amount of communication because, compared to GC couples, LD couples spend less time together FtF and have only an equal amount of mediated communication (Stafford & Merolla, 2007). Other scholars even go as far as to claim that limited FtF interactions seem to lead to greater stability. LD couples may consider the limited communication as something special and attempt to compensate for limited opportunities for physical intimacy through other intimate relating adaptations (Sahlstein, 2004; Stafford & Merolla, 2007; Stafford & Reske, 1990).

The work of Sanderson and Cantor (2001) on intimacy goals and relationship satisfaction further speaks to why the time spent apart may not hurt a relationship. According to their mediation analysis, there are five distinct pathways through which the pursuit of intimacy goals may lead to relationship satisfaction, including spending more time together, interacting in goal-relevant situations, strategically managing conflicts, sharing similar intimacy pursuits and subjectively perceiving the partner as intimacy-oriented. In other words, time spent together is not the only way to connect intimacy goals and relational satisfaction; individuals can achieve the intimacy goals by engaging in other adaptive behaviors and cognitions, such as self-disclosure and empathic responding. Sanderson and Cantor (1995) even empirically show that while time spent together has a considerable impact on relationship satisfaction for individuals with a weak focus on intimacy goals, it has no impact on individuals with a strong intimacy focus. These results suggest that other intimacy enhancing strategies can sufficiently compensate the lack of time spent together.

For these reasons, when time is limited, social interactions are carefully adapted in order to ensure intimacy enhancement (Carstensen et al., 1999). While GC couples may have the luxury to talk about various topics with virtually unlimited conversations, LD couples adapt themselves to talk about more limited but relationally intense topics, such as love, caring and intimacy (Stephen, 1986). Some empirical studies have documented the enactment of intimacy enhancement adaptation: Stafford's (2010) survey on high-level communication patterns shows that LD relationship coping is more intimate, positive, and less conflictual in nature. Relative to GC couples, LD couples reported more intimate talks and events, more avoidance of conflicts and taboo topics, and less discussion of important premarital topics. Relationship maintenance literature also shows indirect evidence for such behavioral adaptation. Johnson and her colleagues (Johnson, Haigh, Becker, Craig, & Wigley, 2008) indicate that openness, and positivity are the most frequently reported maintenance strategies in emails sent to romantic partners, and significantly contribute to relationship stability and satisfaction in LD relationships (Maguire & Kinney, 2010; Westefeld & Liddell, 1982).

Besides these behavioral adaptations, intimacy enhancement is also achieved for LD couples via an intensified idealization route. Idealization, a tendency to perceive partners and relationships in unrealistically positive terms (Fowers, Montel, & Olson, 1996, p. 7), is a common cognitive process that frequently occurs in various close relationships. It is characterized by appraisals of more positive assessment of partner personalities relative to the average partner, fewer disagreements with their partner than actual occurrences, more optimistic perceptions about relationship future, and greater sense of control over relational uncertainty (Murray, Holmes & Griffin, 1996; Murray & Holmes, 1997).

The idealization effect is likely to be magnified in relationships with constrained communication due to an increased focus on positive relational aspects and the behavioral adaptations described above (Schulman, 1974). Studies have reported that partners who are geographically separated (e.g., premarital relationships, exclusively or primary Internet-based relationships) tend to develop idealistic images of the other (Stafford & Reske, 1990; Walther, 1996).

Stafford and Merolla (2007) identified three cognitive and behavioral routes that lead to pronounced relational idealization in the context of LD dating relationships, namely, positive illusion driven by the need for uncertainty reduction, behavioral idealization derived from restricted communication, and selective self-presentation. Of the three routes, positive illusion and behavioral idealization are inherently driven by geographic separation. Stafford and Merolla reason that LD couples have more positive illusions about the partner and the relationship because they need to subjectively perceive great relational rewards (e.g., intimacy, commitment, and satisfaction) exceed the high investments in maintaining an LD dating relationships. The idealized representations of partners and relationships help sustain conviction and dispel heightened uncertainty and doubt (Sanderson & Cantor, 1997; Murray & Holmes, 1997, 1999). Moreover, relative to GC couples, they are not mutually exposed to mundane behaviors; the impressions they form based on restricted communication are likely to be positive because dating couples are motivated to present themselves in a favorable manner.

While excessive idealization of romantic partners or relationships can lead to serious problems, moderate idealization can function as another maintenance strategy for LD dating relationships by helping couples stay positive about partners' traits and future interaction. Research shows that moderate idealization accounts for the longevity of LD dating relationships



(Stafford & Reske, 1990) and promotes stability and commitment of LD dating relationships (Schweibel et al., 1992; Van Horn et al., 1997).

Taken together, the research suggests that intimacy enhancement is a salient theme in LD couples' relational communication as intimacy implies full participation and mutual dependence of two distinct selves and cultivates perceptions of security within a relationship (Guerrero & Andersen, 1991). Restricted communication, reduced interdependence and heightened relational uncertainty stimulate the pursuits of intimacy goals towards which cognition and behaviors are oriented and around which interactions unfold. LD dating couples behaviorally adapt the interactions to focus on love and relational issues (Sahlstein, 2004; Stephen, 1986) and selectively attend to and elaborate the partners' behaviors and relationship situations, potentially leading to greater intimacy in daily interactions compared to GC couples.

#### *Intimate Relating in Mixed-Mode Settings*

Communication technologies have enabled our relationships initiated and maintained in a mixed-mode manner (Walther & Parks, 2002). Hampton, Sessions, Her, and Rainie's (2009) nationally-representative survey shows that people stay connected with both distant and local contacts with a variety of interpersonal media. However, relational communication is not necessarily carried out across multiple media and devices equally. For example, previous research indicates that intimate relating among strong ties is more likely to take place via mobile phones, including both phone calls and text messaging interactions, while emails are more frequently used for expanding weak ties (Kim, Kim, Park, & Rice, 2007; Utz, 2007).

LD relationship research, although limited and atheoretical, also shows that relationship maintenance and intimacy processes differ across interpersonal media. In a study of communication channel use in LD relating, Dainton and Aylor (2002) found that telephone use

was associated with using the strategies of openness (direct discussions, offering and listening to one another) and assurance (covertly and overtly assuring each other), and significantly contributed to relational commitment and satisfaction. Text-based media (e.g., chat and email), on the other hand, are associated with the strategies of positivity (attempts to make interactions pleasant), social networking (relying on friends and family) and shared tasks (performing routine tasks and chores in a relationship), and contributed to greater trust between romantic partners (Dainton & Aylor, 2002). In a recent content analysis on relational maintenance strategies used in personal emails over a one-week period (Johnson et al., 2008), the results are somewhat different: romantic partners most frequently employed the strategy of assurances, followed by the strategies of openness, positivity, and discussing in social networks, although this pattern did not differ between LD and GC relationships.

It is unclear, however, why media matter in LD relationships and how they interact with the factor of geographic separation to produce changes in relational cognitions and behaviors. The studies reviewed above mostly focus on the LD relational communication within one or a couple of media, but they have not systematically compared relational processes across media.

Media comparison studies have suggested some ways of looking at how media may affect intimate relating. For example, media richness theory (Daft & Lengel, 1986) assumes that communicators make media choices by matching the level of media richness or bandwidth with the nature of the task. Rich media, featured with multiple cue systems, immediate feedback, natural conversation language and message personalization, are preferred over lean media for more equivocal communication activities. Because human interactions, intimate interactions in particular, involve dyadic and equivocal exchanges between two partners over time, this approach suggests that FtF, the richest medium, will be more appropriate for intimate relating

relative to somewhat rich media (e.g., video chat, phone chat) and lean media (e.g., text-based media, such as texting, IM and email).

Media richness theory is one of the most widely used media theories; however, its central predictions about media choice have received poor empirical support in organizational communication and other relevant contexts (Walther, 2010). Walther and Parks (2002) pinpoint that one primary pitfall of the theory is that the four sub-dimensions of richness do not align. For example, IM has the least cue multiplicity (only text-based), but it exchanges information synchronously or at least semi-synchronously, affords conversations in natural language, and has a high level of personalized message composition (e.g., emoticon). Similarly, social networking sites, Facebook for example, can share multiple interaction cues (e.g., photos, videos), but exchange messages at a low interaction speed (asynchronously), and has a mixed combination of functions that differ in natural language and message composition (e.g., private message vs. public wall post). Later research that expands or modifies the theory (Dennis & Kinney, 1998; Kahai & Cooper, 2003) reasons that cue multiplicity and immediacy feedback (or synchronicity) reflect the objective characteristics and are more critical dimensions in distinguishing richness than the other two dimensions.

Another problem with the media richness approach is that it takes media users' self-report under free choice conditions as the actual media use and does not consider the availability of media and other social determinants (Markus, 1994). People usually do not have free media choices in daily interaction due to time and space limits, such that they have to rely on a limited number of media for communication. In the case of LD relationships, clearly FtF contact, the most preferred communication medium, is no longer practical. Video chat may be the next preferred choice, but the couples may not both have a video camera at their places. They may

then move to consider having a phone conversation or an instant chat but it is likely that one of them is not available to chat due to schedule conflicts (e.g., a boyfriend in NYC is available to talk but his girlfriend in San Francisco is still sleeping). Finally, they may end up talking to each other asynchronously by text messages or emails.

The key point here is that free media choice is an ideal situation, and the couples, especially LD couples, cannot always communicate with each other via rich media and have to rely on whatever media are available in the specific situation. College students in LD dating relationships may not be able to afford the cost of frequent FtF visits and long phone conversations (Aylor, 2003), and it is impractical to spend hours per day in video or phone chat. By contrast, text-based media, such as text messaging, instant chat and emails provide more convenient, mobile and cheaper choices. Cumming, Lee and Kraut (2006) also identify greater use of CMC media (email, IM, and social networking) over FtF and phone use in LD friendship maintenance due to similar cost concerns, in contrast to media richness predictions.

An alternative adaptive approach (DeSanctis & Poole, 1994) argues that how communicators appropriate and use media also matters. The way a medium is used is influenced by several factors, including technical attributes of media, communicators' interaction goals, personal characteristics, and existing social networks. The unfolding interactions within a medium in turn affect interpersonal relating processes, which may further change the future use of that medium. In particular, several CMC theories further highlight the role of interpersonal goals in the adaptive use of media (Korzenny, 1978; Walther, 1992, 1996; Walther & Bazarova, 2008). For example, the Electronic Propinquity Theory suggests that although communicators are inclined to prefer richer media for informationally complex interactions, when the choice of richer alternatives is restricted, effective and satisfying communication still takes place with lean

media because communicators are capable of making a given medium achieve greater propinquity (Walther & Bazarova, 2008). The Hyperpersonal model (Walther, 1996) argues that communicators in text-based interactions enact selective self-presentation through limited but carefully chosen cues, and such a behavioral adaptation further breeds message receivers' biased interpretations. This kind of motivated adaptation to media also exemplifies the transformative process in interdependence theory (Kelley, 1997; Kelly & Thibout, 1978) whereby conversational partners transform the media constraints for the desired communication effect (e.g., intimacy) with adaptive behaviors and cognitions.

The following section discusses how the behavioral and perceptual adaptation routes discussed above operate in different interpersonal media (e.g., FtF, phone call, video, IM, texting, and email). The adaption dynamics are also connected to the continuous dimensions of cue multiplicity, synchronicity, and mobility because interpersonal media inherently vary along these dimensions rather than fall into dichotomized categories (e.g., synchronous vs. asynchronous, FtF vs. text-based). It should be also noted that interpersonal media vary along several other dimensions, such as reviewability and naturalness (Clark & Brennan, 1991), but they are beyond the scope of this paper and hence will not be discussed here.

#### *Cue multiplicity.*

Cue multiplicity refers to the extent to which the medium conveys multiple cues in the interaction, such as verbal expressions, voice inflection, facial expression and body gestures. FtF has the highest cue multiplicity because it affords the exchange of verbal, audio and visual cues, followed by video chat, phone call, and text-based media (IM, texting and email). Although people have a general preference for cue multiplicity in informationally complex interactions, little evidence shows that media with limited cues, text-based media in particular, hinder the

communication or relational process. For example, a number of CMC studies indicate that text-based interactions equal or exceed relational effects derived from comparable FtF interactions (for a review, see Walther, 1996, 2007; Walther & Parks, 2002).

The underlying mechanism that supports effective interpersonal communication in text-based CMC, according to the social information processing (SIP; Walther, 1992) theory, is the adaptive communication. Walther argues that the loss of nonverbal cues is not fatal because verbal and nonverbal cues are instrumentally interchangeable to support impression formation and convey socioemotional content. More importantly, people are motivated to develop impressions and affinity regardless of medium so that they conduct the encoding and decoding of socioemotional and relational content through various linguistic and behavioral strategies, such as the frequent use of paralinguistic cues (Lea & Spears, 1992), emoticons (Walther & D'Addario, 2001), interactive information seeking and self-disclosure (Tidwell & Walther, 2002), and other creative expressions that contain socioemotional or relational content (Rintel & Pittam, 1997; Utz, 2000; Walther, 1993). The needs to self-enhance also motivate strategic self-presentation whereby individuals highlight the desirable aspects of the self and avoid disclosing the less desirable aspects (e.g., physical unattractiveness) which the sender may not be able to successfully control in FtF (Walther, 1996).

On the other hand, text-based interactions are likely to produce biased interpersonal perceptions. The over-attribution process described in the hyperpersonal model (Walther, 1996) suggests that individuals who communicate exclusively in text-based CMC environments may over-rely on limited, usually selectively presented relational cues and develop more idealized impressions of one another than those who communicate FtF. For example, partner disclosures produce more relationship-focused attributions and greater intimacy perceptions in CMC than

FtF, even when the disclosures are controlled to be equivalent across the two media (Jiang, Bazarova, & Hancock, 2011).

### *Synchronicity.*

Synchronicity is the degree to which messages are exchanged instantaneously and in real-time. Synchronous media, such as FtF, phone call (except voice mail) and video chat, normally involve conversational partners communicating at the same time. IM, while it often affords simultaneous chatting when two partners are online at the same time, tolerates some delay in responses (e.g., the busy or away status indicates unavailability) and hence is categorized as semi-synchronous. Text messaging and email are normally considered as asynchronous media given their much longer response latencies<sup>1</sup>.

It has been shown that humans have an innate preference for highly synchronous interaction over delayed interactions. For example, a delay of more than 2-3 seconds in FtF responses is likely to create discomfort. Cappella's (1991) work on biological origins of automated human communication reveals that failing to respond and reciprocate synchronously produces negative affect and relational dissatisfaction for adults, infants and even neonates. From the perspective of rational choice, asynchronous interactions hinder the optimization of social and psychological resources (Luce, 1991). A delay in response implies inefficient uses of time, and also causes uncertainty and other cognitive efforts used to create and recall the previous acts at a later time.

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<sup>1</sup> An alternative view argues that synchronicity is a property of the interaction because communicators have certain control over how synchronous a conversation is (Walther, 2010). For example, although email and texting are generally asynchronous, they can still be exchanged rapidly if the senders and receivers are online or texting at the same time. In contrast, mobile phone calls are normally synchronous, but they can be asynchronous in such a situation that one identifies the caller by the caller ID, and choose to divert the phone call to voice mail when he/she is not available to talk.

However, synchronous communication is not always achievable in modern society. Virtual collaborating and long-distance relating present lots of situations in which we have to wait for hours or even for a couple of days for the responses. As argued by the Interdependence Theory (Kelley, 1997; Kelly & Thibout, 1978), it is very unlikely that people will live with the high costs of delay without transforming the asynchronous inefficiency. Studies that look at adaptations made to compensate for asynchronous and distributed communication suggest that asynchronous messages (e.g., email) tend to be more focused, concrete and concise, use more emotional expressions, and request feedback (Kock, 2001). The hyperpersonal model (Walther, 1996) also suggests that CMC users even learn to utilize the asynchronous capabilities that afford more deliberate composition of favorable responses without creating obvious discomfort. For example, the asynchronous nature further facilitates highly selective self-presentation in online dating and social networking by allowing users to edit, delete, and rewrite messages (Toma, Hancock, & Ellison, 2008).

#### *Mobility.*

Mobility (or portability) has become a new dimension for communication media, with the rapid adaptation of a number of portable digital devices, namely, mobile phones, laptops, tablet devices, and portable music and game devices. It concerns media accessibility accompanied with physical travel, ranging from situations in which the use of media devices is restricted to a fixed location, to situations in which the media devices accompany individual users across shifting locations and times and provide handy use (Drotner, 2005). For example, within interpersonal media, the mobile phone (phone call and texting) provides the highest mobility as it provides convenient contact via public phone networks with a portable device. CMC media (video chat, IM and email), primarily embedded on a personal computer and Internet, provide some mobility



in general (e.g., users get access by carrying laptops with them or using different computers from different locations). FtF communication is the least mobile medium given that it occurs in traditional locations (e.g., home, restaurants, and cafes) and requires the physical travel of partners to become co-present. Mobility emphasizes the ease with which communicators can enter or exit the interactions when facing time-space constraints (Hemment, 2005) and this central component distinguishes mobility from media synchronicity, which focuses on the speed of communication. For example, the mobile phone, a high mobility device, has a mix of synchronous phone calls and asynchronous text messaging.

Mobile media significantly differ from other communication media by providing communication access in “nowhere-places” and “no-when-times” situations (Caronia, 2005). According to Dimmick, Feaster and Hoplamazian (2011), mobile media are largely used in interstitial situations where individuals have small segments of leisure time for communication, while less mobile media (FtF, landline, PC-based media) are tied to fixed locations and used when individuals have a considerable amount of leisure time. For example, people listen to their ipods during commuting or doing exercises, check news and send text messages at lunch times with smart-phones, and make small phone calls after finish a meeting before heading to the next task. Mobile media hence create additional communication opportunities by making use of the interstices between the activities in people’s lives (Ishii & Wu, 2006).

Because mobile media are often used in these interstitial times, mobile media are often constrained by time and space limits compared to other media. One cannot make long phone calls when in the middle of scheduled activities, such as between meetings. The design of mobile devices also limits how much people can communicate in one single message. One text message

can only deliver up to 160 characters, and people also tend to be concise and focused in messages because it is difficult to type with the small screen and keyboard of mobile phones.

The limits of time and space should activate adaptive behaviors, such as small talk and paralinguistic strategies. For example, Ling and Yttri (2002) discuss the hyper-coordination process in which users create rapport and perceived perpetual contact from mundane, micro-level interactions afforded by mobile phone (e.g., “I’m heading home right now – are you still at work?”). Rettie (2006) argues that even the one-line text message (e.g., “I’m just thinking of you”) is particularly powerful for creating connectedness. A brief but very romantic message may be saved as a symbol of love, and revisiting the message is also a form of reminiscent thinking which is believed to create idealized representations of partners (Stafford & Merolla, 2007).

#### *Summary.*

A limited communication situation does not necessarily equal poor communication effectiveness or impoverished interpersonal relationships. Although human beings can often prefer non-mediated, synchronous and extended communication for intimate relating (e.g., FtF), they can also adapt to communication environments when cues are filtered out, responses are delayed or there is limited time available. This section presents evidence for the transformation process in which communicators adapt their behaviors and cognitions in accordance with different media limits for more smooth and effect relating. In particular, it shows that cue multiplicity, synchronicity and mobility may affect adaptive communication and cognitions in a manner that more constrained media (e.g., more text-based, asynchronous and mobile) activate more behavioral and perceptual adaptations.

## CHAPTER 4

### THE PRESENT STUDY

The purpose of the present study is to examine how the intimacy process operates in LD versus GC dating, using the Interpersonal Process Model of Intimacy (IPMI) as a framework. This investigation pays particular attention to the intimacy enhancement process driven by geographic separation, in which LD dating couples are highly motivated to compensate for the restricted communication, reduced interdependence and heightened relational uncertainty by creating intimacy experiences in their communication. The intimacy enhancement is expected to take place via two routes: behavioral adaptation in communication and perceptual idealization of relationship perceptions. The medium that carries the relational communication is also expected to moderate the levels of behavioral adaptation and perceptual idealization given that media characteristics pose different constraints and opportunities for individuals to encode and decode socioemotional and relational content. These predictions were subsequently tested in a diary study that solicits reports of daily interactions from both dating partners.

This chapter outlines the specific hypotheses on each component of the intimacy process that are derived from the IPMI and the intimacy enhancement mechanisms stated above. The hypothesis about the general intimacy process is presented first, followed by the predictions of behavioral adaption and perceptual idealization across relationship type (LD vs. GC), and finally how interpersonal media play a role in these dynamics.

The first hypothesis concerns testing the boundary of the IPMI in the LD context. Despite the geographical separation, the intimacy process described by the IPMI is expected to operate for LD relationships as it does for GC relationships given that the general course of relationship development is expected to follow the same routes. That is, self-disclosure and partner disclosure

should be positively related to intimacy for both LD and GC dating, and these relationships should be mediated by perceived partner responsiveness.

*H1: Overall, perceived partner responsiveness will mediate the associations between self-/perceived partner-disclosures and intimacy for LD as well as GC dating relationships.*

The second hypothesis seeks to replicate and extend the LD relational positivity observed in prior survey studies to the daily intimacy experiences. Previous studies mostly employ cross-sectional measures so that pre-existing relationship characteristics (e.g, relationship stage and length) are likely to confound the effects of geographic separation on global intimacy. The present study attempts to rule out the influence of global relationship factors when establishing the intimacy enhancement effect.

*H2: Overall, LD participants will experience greater intimacy than GC participants in everyday interactions, controlling for pre-existing relationship characteristics.*

Next, if LD dating couples experience greater intimacy in specific interactions relative to GC couples, what are the relational mechanisms that drive this enhancement effect? As discussed earlier, one possibility is that LD dating couples carefully navigate the restricted communication opportunities and enact more rewarding communication styles for greater intimacy. Because self-disclosure serves as a major act of intimacy-enhancement (Dainton, 2003; Derlega, Metts, Petronio, & Margulis, 1993; Sprecher & Hendrick, 2004), a behavioral adaptation effect is expected to be driven by geographic separation such that, on an *interaction-by-interaction* basis, self-disclosure will be greater in LD than in GC dating (Figure 3).

*H3: Participants engaged in LD dating relationships will report higher levels of self-disclosures than those in GC dating relationships in daily interactions.*

In addition, the enhancement of intimacy is predicted to be achieved via a concurrent idealization process in which LD dating partners couples form more idealized partner and relationship perceptions compared to GC partners. To ward off the unfavorable interdependence state and heightened relational uncertainty, LD couples are motivated to see their partners as more open/disclosing and more responsive to their needs, and feel more intimate towards each other in daily conversations. The behavioral adaptation to more open, intimate disclosures further provides a behavioral base to develop positive illusions about their partner' disclosures and responses, that is, LD couples should weight the increased disclosures more highly when they judge the partners' disclosures and responsiveness. Therefore, an idealization effect independent from the behavioral and carryover effects (e.g., proportionate increases caused by increases in self-disclosure and partner disclosures) is expected (Figure 3):

*H4: LD dating partners will score higher on perceptions of (a) partner disclosure, (b) partner responsiveness and (c) intimacy than GC partners when the behavior or carryover effects are controlled for.*

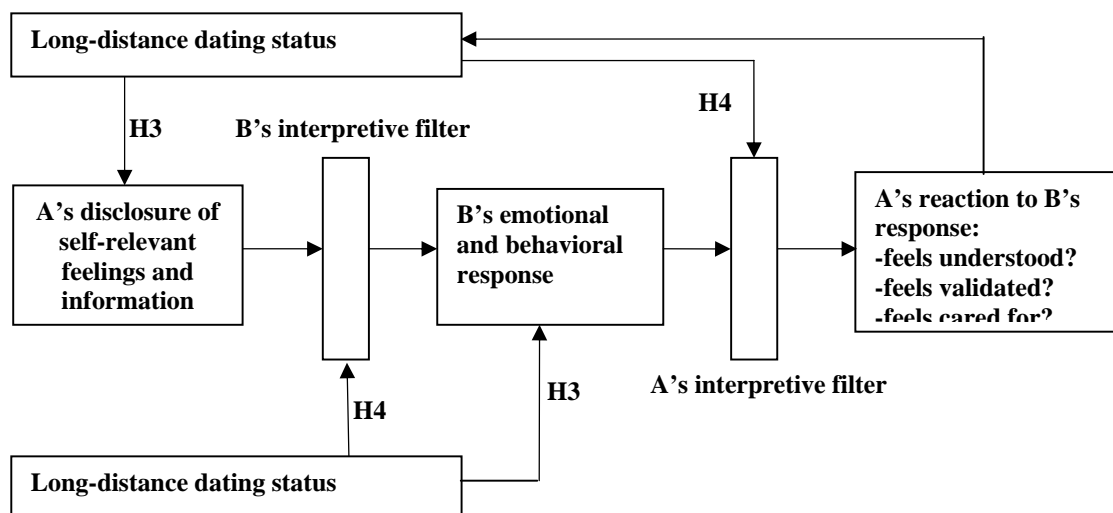


Figure 3 Prediction on the effect of geographic separation on the intimacy process

The final set of hypotheses is concerned with how interpersonal media interplay with geographic separation to affect the intimacy process. In particular, how do interpersonal media affect behavioral adaptation and perceptual idealization? First, consider the effects of interpersonal media on behavioral adaptation. When individuals communicate in media that involve reduced cues, reduced synchronicity or increased mobility, to support sufficient interpersonal exchange, they should increase behavioral adaptation by self-disclosing more frequently. That is, relative to GC couples, LD couples should engage in greater self-disclosure behaviors as cue multiplicity and synchronicity decreases, and as media mobility increases.

*H5a: As cue multiplicity decreases, the adaptation of self-disclosure behaviors increases.*

*H5b: As synchronicity decreases, the adaptation of self-disclosure behaviors increases.*

*H5c: As mobility increases, the adaptation of self-disclosure behaviors increases.*

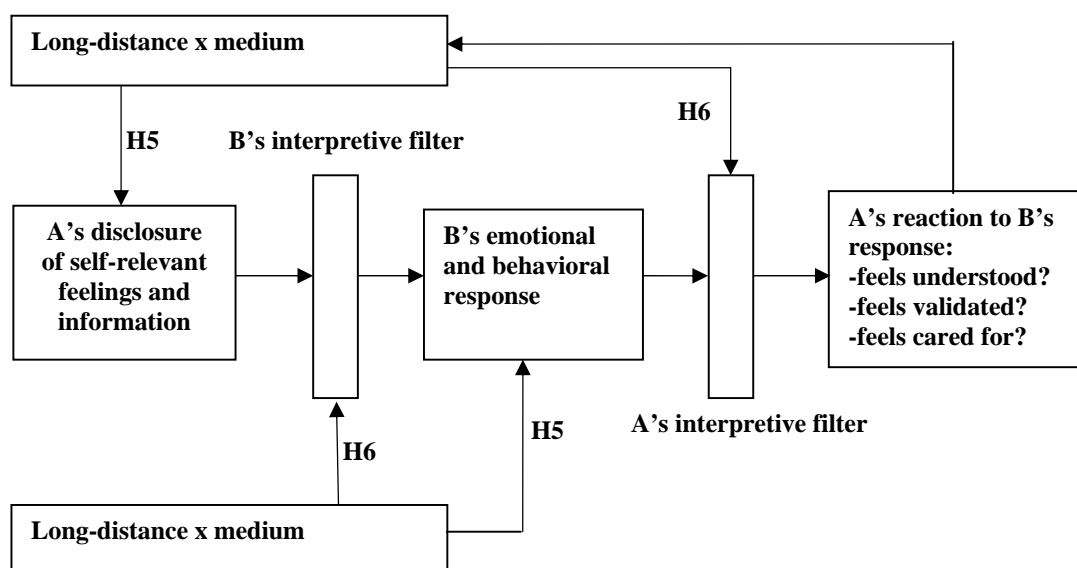


Figure 4 Prediction on the effect of media on the intimacy process

Next consider the effects of interpersonal media on perceptual idealization. The idealization effect is also predicted to vary along cue multiplicity, synchronicity, and mobility. The reason is twofold: first, limited cues, synchronicity and communication time should lead to

reduced information exchange, and the limited information should be over-interpreted by LD couples in a more idealizing manner so that they can stay positive about the relationship. Second, the increased behavioral adaptation in constrained media situations proposed above should provide a behavioral base to develop positive illusions about partners and relationships. Therefore, the idealization of relationship perceptions is predicted to increase as cue multiplicity and synchronicity decreases, and as media mobility increases.

*H6a: As cue multiplicity decreases, the idealization effect on partner disclosure, partner responsiveness and intimacy increases.*

*H6b: As synchronicity decreases, the idealization effect on partner disclosure, partner responsiveness and intimacy increases.*

*H6c: As mobility increases, the idealization effect on partner disclosure, partner responsiveness and intimacy increases.*

## CHAPTER 5

### METHODS

#### *Design*

The hypotheses were examined in a diary study whereby dating couples completed online surveys with regard to their day-to-day interactions over a one-week period. The diary method was chosen for a variety of reasons (Bolger, David, & Rafaeli, 2003): first, it allows examining specific interactions in their natural contexts, providing information difficult to be obtained by experiments or traditional survey; second, it increases self-report accuracy by minimizing the amount of time elapsed between an experience and retrospection; finally, it permits the estimation of within-person differences and between-person variability for specific interactions, better capturing the dynamic nature of the intimacy processes. In addition to the diary surveys, the couples also attended pre- and post-diary sessions to complete relationship history and global relationship measures.

#### *Participants*

Sixty-seven heterosexual dating couples were recruited from several communication and psychology classes to participate a dating diary study. Four couples (1 LD couple and 3 GC couples) withdrew from the study in the middle of the week, so the final sample included 63 couples (30 LD couples and 33 GC couples; N of participants = 126). The average age of the sample was 20.97 years ( $SD = 2.55$ ), ranging from 18 to 34 years. The majority of the sample (73%) were college students, 7.9 % had a high school diploma or equivalent, 11.9 % had a college degree, and 7.1% had a master degree or higher. The ethnicity composition of the sample was 54 % Caucasian, 30.2% Asian, 7.8% African American, 2.4% Hispanic, 1.6% Native American & Pacific Islander, and 4% other. The average length of relationships was 22.71



months ( $SD = 20.43$ ), ranging from 1 to 125 months. 49.2 % of the participants considered the relationship as committed (intense feeling of love, serious plans for the future), 31.7% as serious (feeling of trust, attraction, love and interdependence), 15.1 % as somewhat serious (increased interaction, affection, dependence on each other), and 4% as causal (sharing superficial information, uncertain about the future of the relationship). The thirty LD couples ( $N = 60$ ) on average had been geographically separated for 17.03 months ( $SD = 11.22$ ; range = 1 – 40 months) and most of them were separated for school reasons (96.7%). The LD couples lived apart from each other with different distances, ranging from 37 to 3981 miles ( $M = 539.17$ ,  $Median = 170$ ,  $SD = 930.87$ ). Relevantly, 6.7 % of them could see each other FtF once a week or more frequently, 30% 2-3 times a month, 30% once a month, 30% less than once a month, and 3.3 % had very rare FtF contact.

### *Procedure*

The recruitment materials described the nature of study as understanding communication in LD and GC dating relationships. The study description also provided criteria for participants to determine their relationship type (e.g., A long-distance relationship is one where partners are not able to see each other, FtF, on a daily basis due to geographical separation; Dellman-Jenkins et al., 1994), and specified that the couple had to be dating for at least one month and were not married. Each participant was compensated with 2 extra course credits or a \$20 Amazon gift card, as well as an opportunity to win a flip camera in a raffle if they successfully completed all the diaries. The couples were asked to provide copies of text-based interactions at the end of the diary week, for which they received extra compensation (1 extra credit or a \$10 Amazon gift card for each partner). If they agreed to provide the copies, they were asked to achieve their texting, IM and email records.

Each couple signed up for the study by providing both partners' email addresses and mobile phone numbers and indicating whether they were in a long-distance relationship or not. They then received a pre-diary survey via email which included questions about relationship history (e.g., relationship length, global relationship measures, relationship type, geographical distance and reasons for separation for LD couples) and personal demographics (e.g., age, gender, education, ethnicity, get-up time, and bedtime), and a tutorial that explained how they should track the interactions in each medium (FtF, phone chat, video chat, texting, IM, email, and social networks; see Appendix 1 for the tutorial materials). One interaction was defined as an encounter of any length in which the dating partners attended to one another, conversed, and adjusted their behavior in response to one another via any communication media (Duck et al., 1991).

To ensure that the participants fully understood the tutorial, a follow-up session (either via phone call or web-based survey) was conducted to ask the participants' judgments about 9 interaction scenarios and probed for any questions they might have. The scenarios presented in the phone and web-based follow-up sessions were identical; the only difference was that in the phone session they were read aloud by research assistants but in the web-based session they were presented in text. The participants were also told to use their own judgments for difficult cases.

When the diary started, each participant received an email link to the daily survey. In the survey, the participant recalled all the interactions he or she had with their partners within the day. For each interaction, the participant reported its communication medium and interaction length, and rated the levels of disclosure, responsiveness, intimacy, and deception<sup>2</sup>. Because it is crucial to retain participants and increase response accuracy in the 7-day diary period, the following rules were communicated to the participants several times over the study period: 1)

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<sup>2</sup> The deception data were not relevant to the current study hence not reported.

every diary would only take about 10 minutes every day and would not place a great burden on them; 2) ideally they should report right after the interaction for accurate responses and smart-phone users were encouraged to complete the diary via the phone; 3) they were encouraged to divide the day into several small periods for diary entry, and that they would receive three text messages (at 12pm, 6pm, and 30 minutes before bedtime) reminding them of reporting the interactions happened in the morning, in the afternoon and in the evening; 4) it would be better to respond late than to not respond at all.

After they had finished the 7-day diary, the participants completed the global relationship measures again as a post-diary measurement. The research assistants collected text-based communication records from the couples who had consented to submit the records. These participants were given the option of not turning in any messages they believed to be too private or sensitive. All the participants were thanked and compensated for their participation.

### *Diary Measures*

Diary measures were constructed to assess the IPMI components (Reis & Shaver, 1988) and were modeled after the format used in previous diary studies (e.g., Laurenceau et al., 1998; Laurenceau et al., 2005; Shelton, Trail, West, & Bergsieker, 2010) that test this model (see Appendix 2 for full items). For each identified interaction, the participant first reported the medium and length of the interaction and then rated the degree of self-disclosure, partner disclosure, perceived partner responsiveness, and intimacy on a 7-point scale (1 = strongly disagree, 7 = strongly agree).

*Interpersonal media.* The participant was asked to identify the medium of interaction by choosing one of the following: FtF, phone call, video call, texting, IM, and email. Facebook posts were categorized as email due to its asynchronous and text-based nature.

*Interaction length.* The participant reported how long the interaction lasted by rating the length on a 7-point interval scale (for FtF, phone call and video call interactions, 1 = less than 15 minutes, 7 = more than 1.5 hours; for texting, IM and email interactions, 1 = less than 5 messages and 7 = more than 30 messages).

*Self-disclosure (SD).* Participants rated the degree to which they disclosed personal information and emotions to their partners in each interaction. Two items from previous disclosure diary studies (Laurenceau et al., 2005; Shelton et al., 2010) were used to assess emotional factual and emotional disclosures, respectively: “I shared personal experience and thoughts during this interaction”, and “I told my partner about my personal feelings or emotions”, Pearson’s  $r = .74$ .

*Perceived partner disclosure (PPD).* Two parallel items were used to assess partners’ disclosures in each interaction: “My partner shared experience and thoughts during this interaction”, and “My partner told me about his/her personal feelings or emotions”, Pearson’s  $r = .73$ .

*Perceived partner responsiveness (PPR).* Participants rated the degree to which they felt their partners were responsive to their needs in each interaction. Three items (Laurenceau et al., 2005) were used to assess perceived partner responsiveness: “My partner understood what I said”, “My partner gave positive comments toward what I said”, and “My partner expressed caring for me during the interaction”, Cronbach’s  $\alpha = .82$ .

*Intimacy (I).* Participants indicated how intimate they felt to their partner during the interaction by one item “I feel close to my partner following this interaction”. Following previous studies (Laurenceau et al., 2005; Shelton et al., 2010), the word “close” rather than “intimate” was used to capture the degree of psychological closeness rather than physical or

sexual, proximity. Single-item measure is normally not encouraged in instruments, but it has been argued that single-item measures of intuitive concepts (e.g., well-being, intimacy) can be valid and justifiable, particularly in diary studies (Laurenceau et al., 2005).

### *Global Relationship Measures*

Global relationship measures were completed in both pre-diary and post-diary surveys (see Appendix 3 for full items).

*Relationship uncertainty.* 12 items from Knobloch and Solomon's (1999) *Relational Uncertainty Scale* (RUS) were adopted. This set of items asked the question how *certain* the participant felt about mutual understanding (e.g., whether you and your partner feel the same way about each other), relationship definition (e.g., how you and your partner would describe this relationship), relationship norms (e.g., what you can or cannot say to each other in this relationship) and future plans (whether or not you and your partner will stay together) on a 7-point scale (1 = very uncertain, 7 = very certain, Cronbach's  $\alpha_{\text{pre-diary}} = .92$ , Cronbach's  $\alpha_{\text{post-diary}} = .91$ ). All the items were reversely coded to create a scale of relational uncertainty; higher scores reflect higher levels of relational uncertainty.

*Relationship satisfaction.* Participants rated the degree of relationship satisfaction with a seven-item relationship assessment scale (RAS; Hendrick, 1988). The scale asked "how well does your partner meet your needs?", "how satisfied are you with your relationship?" "how good is your relationship compared to most?" "how often do you wish you hadn't gotten in this relationship" "to what extent has your relationship met your original expectations?" "how much do you love your partner?" "how many problems are there in your relationship?" on a 7-point scale (1 = very little, 7 = very much, Cronbach's  $\alpha_{\text{pre-diary}} = .85$ , Cronbach's  $\alpha_{\text{post-diary}} = .86$ ).

*Relationship commitment* was measured by a seven-item commitment scale (Rusbult, Martz, & Agnew, 1998). This set of measures asked the participants to rate seven relationship statements on a 7-point scale (1 = strongly disagree, 7 = strongly agree; Cronbach's  $\alpha_{\text{pre-diary}} = .89$ , Cronbach's  $\alpha_{\text{post-diary}} = .86$ ), including "I want our relationship to last for a very long time," "I am committed to maintaining my relationship with my partner," "I would not feel very upset if our relationship were to end in the near future," "It is likely that I will date someone other than my partner within the next year," "I feel very attached to our relationship-very strongly linked to my partner," "I want our relationship to last forever," "I am oriented toward the long-term future of my relationship."

## CHAPTER 6

### RESULTS

#### *Data Analysis Strategy*

Recall that in the study each couple included two participants and each participant completed communication diaries for 7 days by reporting all the interactions between the couple that occurred in a variety of interpersonal media within the day. The data presented a hierarchical structure, with different numbers of interactions nested within each day, 7 days nested within each participant and 2 participants nested within each couple. Thus, all the observations in this multilevel data set had some non-zero covariance because they came from the same person's self-report, and they were correlated with the partner's observations given that the two partners were reporting the same interactions. The linear mixed model (LMM) procedure in SPSS (Peugh, & Enders, 2005; West, 2009) was used to take care of the dependence among multilevel observations, with three random effects (couple, couple x gender, and couple x gender x day) estimated in the modeling. Besides its flexibility in handling observation dependency, LMM was also chosen for its capability of analyzing unbalanced observations across participants and across different days.

There were four dependent variables in the analysis, including a behavior measure of self-disclosure and three perceptual measures (perceived partner disclosure, perceived partner responsiveness and intimacy). Each LMM model regressed on a single dependent variable with restricted maximum likelihood estimations. Theoretically interesting variables (e.g., relationship type, communication medium) and relevant factors (e.g., gender, interaction length, pre-existing relationship characteristics, etc.) were included in the initial model and tested for main effects and possible interaction effects. Non-significant effects were removed stepwise; only significant

effects and theoretically interesting effects were retained. Similar to traditional regression approach, LMM analysis generates coefficient estimates for each fixed effect and also provides 95% confidence intervals (CI) for each estimate, which were used for comparing strengths of fixed effects. Estimated marginal means (and standard errors) were also requested for categorical predictors (e.g., relationship type, medium, and gender) and referred to as means in the following results. All the pairwise comparisons were conducted with the Bonferroni adjustment. Hox's (2002) stepwise progression of model testing was used to guide the model specification.

The primary analytical focus was to test the effects of relationship type (LD vs. GC) and interpersonal media on behavioral adaptation in self-disclosure and idealization of relationship perceptions. As discussed previously, the level of behavioral adaptation, or the extent to which LD couples change their communication behaviors to conquer the geographical limits, was indexed by the effect of relationship type on self-disclosure behaviors. Perceptual idealization was indexed by the effects of relationship type on the three situated relationship perceptions after controlling for corresponding behavioral effects or carryover effects (for perceived partner disclosure, the partner's self-report was controlled for; for perceived partner responsiveness, the effects of self-disclosure and perceived partner disclosure were controlled for; for intimacy, the effects of self-disclosure, perceived partner disclosure and perceived partner responsiveness were controlled for).

### *Descriptives*

Preliminary analyses were conducted to describe the basic interaction and relationship characteristics. The unit of analysis used in this study was each reported interaction, because the hypotheses focused on the intimacy process on an interaction-by-interaction basis. However, due to the unpaired observations between the two partners (two partners were independently



reporting the interactions so their reports contained some inconsistency and it is impossible to pair up the observations), summary measures were also aggregated at the day level for each medium to facilitate comparisons.

*Interaction quantity* was assessed by calculating (a) the mean number of interactions per day and (b) the median length of interactions (in minutes or message amounts). In total, the 126 participants submitted 876 diaries (6 missing diaries) over the diary week with a total of 3024 interactions, including 1038 FtF interactions, 557 phone-call interactions, 101 video-chat interactions, 1090 texting interactions, 202 IM interactions and 36 email interactions. They reported an average of 3.45 interactions per day ( $SD = 2.15$ ), ranging from 1 to 14 interactions. Each day the couples used about 2 communication media to interact with each other (including FtF:  $M = 1.87$ ,  $SD = .74$ , range = 1 - 4 media; excluding FtF:  $M = 1.70$ ,  $SD = 1.00$ , range = 1 - 4 media).

Overall, GC participants ( $M = 3.69$ ,  $SE = .11$ ) reported more interactions per day than LD participants ( $M = 3.19$ ,  $SE = .09$ ),  $t(866) = 3.45$ ,  $p < .001$ . The average number of communication media (including FtF) used per day did not differ between LD and GC couples ( $M_{LD} = 1.87$ ,  $SE = .04$ ;  $M_{GC} = 1.88$ ,  $SE = .03$ ),  $t(873) = .10$ ,  $p = .98$ ; however, LD couples reported using more mediated channels for communication ( $M_{LD} = 1.83$ ,  $SE = .04$ ;  $M_{GC} = 1.58$ ,  $SE = .05$ ),  $t(851) = 3.93$ ,  $p < .001$ . LD participants had fewer FtF interactions per day than GC participants,  $t(628) = 22.47$ ,  $p < .001$ , but they had more phone call, video call, texting, and IM interactions than GC participants, all  $t > 3.01$  and all  $p < .01$ . The number of email interactions did not differ between LD and GC participants,  $t(864) = 1.36$ ,  $p = .18$ , but both groups reported little communication via email (see Table 1 for means and standard deviations).

Table 1.

*Means and standard deviations of interaction number across interpersonal media and across relationship type*

	FtF	Phone	Video	Texting	IM	Email
LD	.20 <sup>a</sup>	1.01 <sup>b</sup>	.23 <sup>b</sup>	1.39 <sup>b</sup>	.33 <sup>b</sup>	.03 <sup>a</sup>
( <i>n</i> = 418)	(.69)	(.69)	(.53)	(1.43)	(.67)	(.19)
GC	2.08 <sup>b</sup>	.29 <sup>a</sup>	.01 <sup>a</sup>	1.12 <sup>a</sup>	.14 <sup>a</sup>	.05 <sup>a</sup>
( <i>n</i> = 458)	(1.64)	(.73)	(.08)	(1.19)	(.42)	(.23)

Note: Means with different superscripts within each column were different. FtF = face-to-face; IM = instant messaging.

The length of interactions for each medium was considered separately since the length was measured by different units. The median lengths of FtF interactions, phone calls and video calls were 1 – 1.5 hours (51.2 % reported on at least that level), 45 – 60 minutes (62.4% reported on at least that level), and less than 15 minutes (58.7% reported on that level) respectively; the median lengths of text-based interactions were 21 - 25 messages for IM interactions (60.9 % reported on at least that level) , 6 -10 messages for texting (62.8% reported on at least that level) and less than 5 messages for email interactions (83.3% reported on that level).

The lengths of interactions for each medium were also compared across the two relationship types with Mann-Whitney tests. Overall, the interactions of LD couples were lengthier than the GC counterparts for FtF, phone calls video chat and texting, all  $Z > 2.34$  and all  $p > .05$ ; but the lengths of IM and email conversations did not differ between LD and GC couples, both  $Z < .92$  and both  $p > .90$  (see Table 2 for medians and interquartile ranges). Because LD and GC couples differed in the number of interactions and interaction length, these two variables were used as covariates in the subsequent analyses.

Table 2.

*Medians and interpercentile ranges of interaction length across interpersonal media and across relationship type*

	FtF	Phone	Video	Texting	IM	Email
LD	7.00 <sup>b</sup>	2.00 <sup>b</sup>	4.00 <sup>b</sup>	2.00 <sup>b</sup>	5.00 <sup>a</sup>	1.00 <sup>a</sup>
(n = 418)	(5)	(1)	(3)	(3)	(4)	(0)
GC	5.00 <sup>a</sup>	1.00 <sup>a</sup>	2.00 <sup>a</sup>	2.00 <sup>a</sup>	5.00 <sup>a</sup>	1.00 <sup>a</sup>
(n = 458)	(5)	(0)	(0)	(2)	(3)	(0)

Note: Means with different superscripts within each column were different. For FtF (face-to-face), phone and video call, 1 = less than 15 minutes and 7 = more than 1.5 hours; for texting, IM (instant messaging) and email interactions, 1 = less than 5 messages and 7 = more than 30 messages.

*Relationship characteristics.* Preliminary analyses also probed for any pre-existing differences in relationship characteristics that might affect the intimacy process. LD couples, compared with GC couples, had longer relationship lengths ( $M_{LD} = 29.86$  months,  $SE = 2.87$ ;  $M_{GC} = 17.11$  months,  $SE = .211$ ),  $t(124) = 3.88$ ,  $p < .001$ ; and reported greater relationship commitment ( $M_{LD} = 6.26$ ,  $SE = .13$ ;  $M_{GC} = 5.78$ ,  $SE = .14$ ),  $t(124) = 2.53$ ,  $p < .05$ . But their levels of relationship satisfaction did not differ from those of GC couples ( $M_{LD} = 6.09$ ,  $SE = .13$ ;  $M_{GC} = 5.95$ ,  $SE = .09$ ),  $t(124) = .85$ ,  $p = .40$ , indicating that LD and GC relationships are equally satisfied. LD and GC participants also did not differ on the overall relational uncertainty ( $M_{LD} = 2.81$ ,  $SE = .12$ ;  $M_{GC} = 3.06$ ,  $SE = .11$ ),  $t(124) = 1.64$ ,  $p = .11$ , but a significant difference was detected for the sub-dimension of future uncertainty. LD participants felt much more uncertain about the future of the relationship than GC participants ( $M_{LD} = 2.26$ ,  $SE = .19$ ;  $M_{GC} = 3.00$ ,  $SE = .17$ ),  $t(124) = 2.90$ ,  $p < .01$ . These relationship characteristics were also used as covariates in the subsequent analyses.

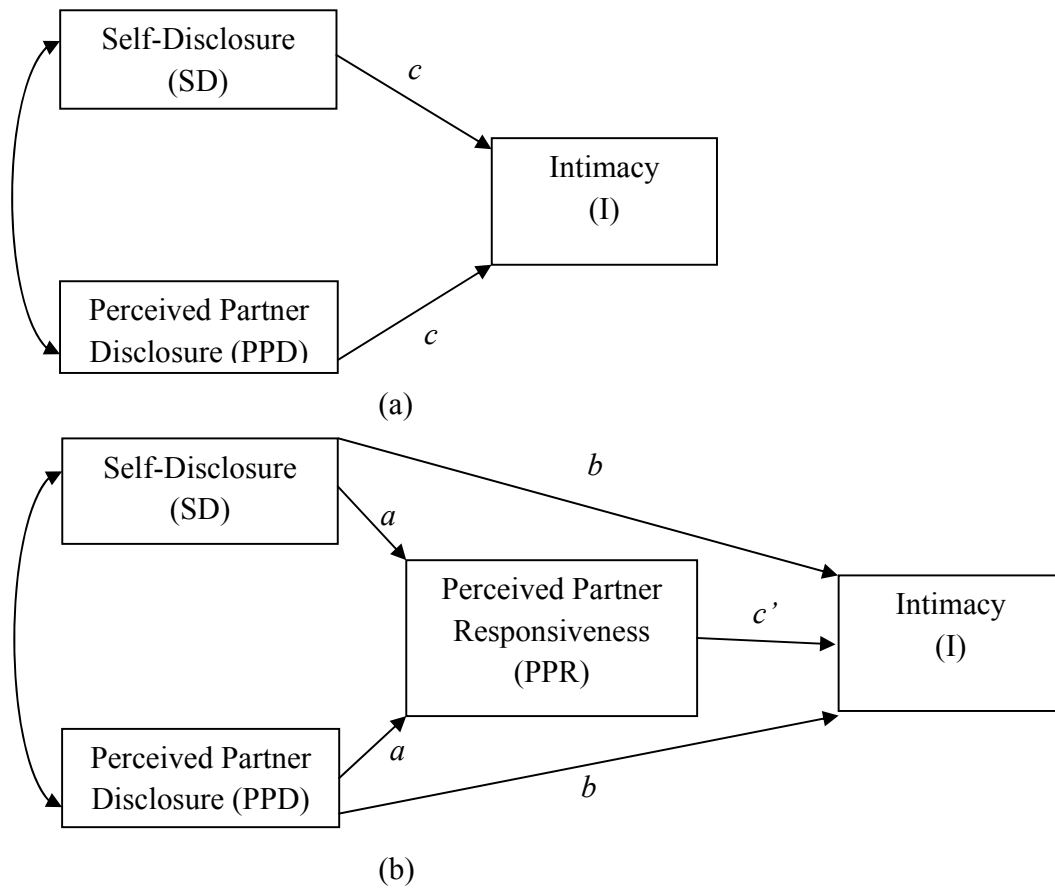


Figure 5a & 5b Mediation analysis for H1

### General Intimacy Process

Recall that the first hypothesis proposed that perceived partner responsiveness would mediate the associations between self-/perceived partner disclosures and intimacy as the IPMI predicted. Following Baron and Kenny's (1986) traditional mediation methodology, four effects were tested with the LMM analyses: the effect of self-/perceived partner disclosures on perceived partner responsiveness (*path a*), the effects of perceived partner responsiveness on intimacy (*path b*), and the effects of self-/perceived partner disclosures on intimacy before (*path c*) and after controlling for the effects of perceived partner responsiveness (*path c'*). The mediations were indicated by the significance of *path a - c* and a reduction in path strength when comparing *path c* with *path c'*. All the path coefficients ( $\beta$ ) reported here are standardized betas.

Additional Sobel tests (Hayes, 2009; Sobel, 1982) assessed whether the mediated, indirect effects self-/perceived partner disclosures on intimacy (*path a x b*) were significantly different from zero. In all the LMMs, gender, interaction quantity (number of interaction reported each day and z-score of interaction length) and relationship characteristics (relationship length, relationship satisfaction, relational uncertainty, and relationship commitment) were included as covariates and modeled as fixed factors<sup>3</sup>. The proposed mediation effects were first tested with the whole sample and then tested for LD and GC samples separately to probe for any moderating effects of relationship type.

First, to examine the effects of self-/perceived partner disclosures on perceived partner responsiveness (*path a* in Figure 5b), a LMM analysis was performed on perceived partner responsiveness with self-disclosure and perceived partner disclosure as predictors. Both self-disclosure and perceived partner disclosure significantly predicted perceived partner responsiveness: for self-disclosure,  $\beta = .21$ ,  $SE = .02$ ,  $t(2918.75) = 9.15$ ,  $p < .001$ ; for perceived partner disclosure,  $\beta = .29$ ,  $SE = .02$ ,  $t(2923.46) = 12.49$ ,  $p < .001$ . Then, two LMM models were constructed to predict intimacy, one that included both self disclosure and perceived partner disclosure as predictors and one that added perceived partner responsiveness as a mediator between self-/perceived partner disclosures and intimacy. As predicted, the predictions of self-disclosure and perceived partner disclosure achieved significance (*path c* in Figure 2a): for self-disclosure,  $\beta = .16$ ,  $SE = .02$ ,  $t(2925.45) = 7.02$ ,  $p < .001$ ; for perceived partner disclosure,  $\beta = .28$ ,  $SE = .02$ ,  $t(2928.63) = 11.97$ ,  $p < .001$ . When perceived partner responsiveness was added to predict intimacy, the additional variance explained by the second model was significantly

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<sup>3</sup> Unless noted elsewhere, gender, all the LMM analyses included gender, interaction quantity (number of interaction reported each day and z-score of interaction length) and relationship characteristics (relationship length, relationship satisfaction, relational uncertainty, and relationship commitment) as covariates and modeled them as fixed factors.

different from zero,  $\lambda^2(1) = 1494.41, p < .001$ , suggesting a significant increase in model fit.

Perceived partner responsiveness significantly predicted intimacy (*path b* in Figure 5b),  $\beta = .64$ ,  $SE = .01$ ,  $t(3013.24) = 44.07, p < .001$ . More importantly, for *path c'*, the prediction of self-disclosure became non-significant,  $\beta = .03$ ,  $SE = .02$ ,  $t(2964.68) = 1.67, p = .10$ ; the prediction of perceived partner disclosure remained significant but produced a smaller path coefficient,  $\beta = .10$ ,  $SE = .02$ ,  $t(2958.05) = 5.27, p < .001$ . Thus, perceived partner responsiveness fully mediated the effect of self-disclosure on intimacy (*Sobel statistic* = 8.96,  $p < .001$ ) and partially mediated the effect of perceived partner disclosure on intimacy (*Sobel statistic* = 12.02,  $p < .001$ ).

The same set of analyses was performed on LD and GC samples separately to explore whether the relationship status would moderate the intimacy processes. The mediational relation of self-/ partner disclosure  $\rightarrow$  perceived partner responsiveness  $\rightarrow$  intimacy predicted by the IPMI held for both LD and GC groups, which suggests that the IPMI had predictive validity for both LD and GC intimacy processes (see Figure 6a and 6b for standardized path estimates). The 95% CIs of paralleled LD and GC estimates were compared for any significant differences, and the comparison indicated that most path estimates in the IPMI model did not differ between two groups except for the effect of self-disclosures on intimacy after controlling for perceived partner responsiveness (*path c'*). For the LD group, this path became non-significant after controlling perceived partner responsiveness,  $t(1290.02) = -1.36, p = .17$ , indicating a full mediation; the same path for GC groups remained significant but produced a smaller path coefficient,  $\beta = .07$ ,  $SE = .02$ ,  $t(1665.30) = 2.81, p < .01$ , indicating a partial mediation. An additional moderated

mediation analysis<sup>4</sup> also confirmed that the mediational relation of self-disclosure → perceived partner responsiveness → intimacy was stronger for LD than that for GC participants.

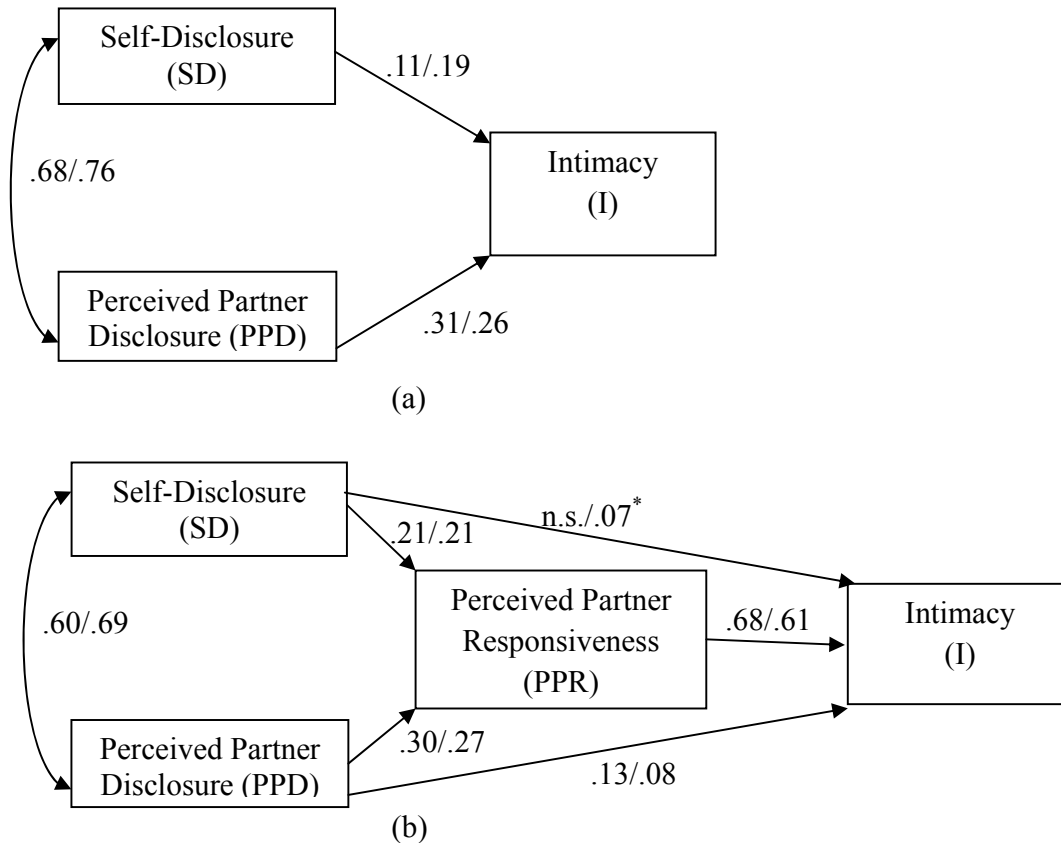


Figure 6a & 6b Intimacy processes for LD and GC dating couples

Note: The path estimates for LD appear first, followed by the estimates for GC. No significant difference on path estimates was detected between LD and GC except for the effect of self-disclosure on intimacy (indicated as \*).

<sup>4</sup> Muller, Judd, and Yzerbyt (2005) suggest the following regressions for testing moderated mediation: 1) the dependent variable was predicted by independent variable, the moderator, and their interaction; 2) the mediator was predicted by the independent variable, the moderator, and their interaction; 3) the dependent variable was predicted by the independent variable, the moderator, the mediator, and the interaction of independent variable and moderator and the interaction of the moderator and mediator. Moderated mediation is supported when the predictions of independent variable in the first two regressions and the interaction effect of the mediator and the moderator in the third regression achieve significance. In this analysis, the independent variable was self-disclosure, the mediator was perceived partner responsiveness, the dependent variable was intimacy, and the moderator was relationship type. The moderated mediation analysis indicated that relationship type moderated the mediation of perceived partner responsiveness.

### *Intimacy Enhancement Process in Long-Distance Relationships*

The second hypothesis was concerned with the overall intimacy across relationship type. A LMM analysis was performed on intimacy with relationship type as the predictor, controlling for relevant covariates (gender, interaction quantity and relationship characteristics). The LMM revealed that, consistent with H2, LD couples ( $M = 6.08$ ,  $SE = .09$ ) experienced greater intimacy than GC couples ( $M = 5.80$ ,  $SE = .09$ ),  $\beta = .27$ ,  $SE = .13$ ,  $t(58.96) = 2.14$ ,  $p < .05$ . This result supported previous research on the effect of LD dating relationships producing greater intimacy compared to GC dating relationships.

*Table 3.*

*Means and standard errors for dependent variables across two relationship types*

	LD		GC	
	Mean	SE	Mean	SE
Self-disclosure	5.95 <sup>b</sup>	.09	5.59 <sup>a</sup>	.09
Partner disclosure	5.93 <sup>b</sup>	.09	5.62 <sup>a</sup>	.09
Partner disclosure <sup>1</sup>	5.86 <sup>b</sup>	.07	5.63 <sup>a</sup>	.06
Perceived partner responsiveness	6.16 <sup>b</sup>	.07	5.95 <sup>a</sup>	.07
Perceived partner responsiveness <sup>1</sup>	6.10 <sup>a</sup>	.05	6.00 <sup>a</sup>	.05
Intimacy	6.08 <sup>b</sup>	.09	5.80 <sup>a</sup>	.09
Intimacy <sup>1</sup>	5.94 <sup>a</sup>	.05	5.90 <sup>a</sup>	.05

Note: <sup>1</sup> indicates that the analysis controlled for corresponding behavioral or carryover effects.

The mean difference on self-disclosure reflects the level of behavioral adaptation, and the mean differences on the three perceptual variables reflect the level of perceptual idealization for each variable after controlling for the behavioral and/or carryover effects.

The third set of hypotheses (H3 and H4) predicted that long-distance status would lead to intimacy enhancement by motivating the LD couples to engage in self-disclosure adaptation and



to form idealized perceptions of partner disclosure, partner responsiveness and intimacy. To test these predictions, four LMM analyses were performed on self-disclosure, perceived partner disclosure, perceived partner responsiveness and intimacy with relationship type as the predictor, controlling for the relevant covariates and corresponding behavior or carryover effects. In these analyses, the mediating effects of perceived partner responsiveness remained consistent with the overall patterns revealed in the earlier analysis, and hence are not reported. Table 3 reports means and standard errors of the four dependent variables across two relationship types.

*Adaptation of self-disclosure.* As hypothesized, the effect of relationship type on self-disclosure was significant,  $\beta = .36$ ,  $SE = .13$ ,  $t(59.54) = 2.68$ ,  $p < .01$ . LD couples ( $M = 5.99$ ,  $SE = .10$ ) reported more self-disclosures than GC couples ( $M = 5.64$ ,  $SE = .13$ ), confirming the behavioral adaptation effect that LD couples engaged in more self-disclosures. Therefore, H3 was supported.

*Idealization of partner disclosure.* Relationship type also had a significant effect on perceived partner disclosure,  $\beta = .31$ ,  $SE = .13$ ,  $t(59.45) = 2.41$ ,  $p < .05$ . LD couples ( $M = 5.89$ ,  $SE = .09$ ) perceived their partners to be more disclosing than GC couples ( $M = 5.63$ ,  $SE = .08$ ). However, this effect is not sufficient to establish the perception idealization effect on partner disclosure perceptions because there was a possibility that the partners were behaviorally more disclosing and these perceptions just mirrored the behavioral change. Therefore, another LMM was performed at the day level<sup>5</sup>, including the partner's self-reported self-disclosure score as a control. The model revealed that the effect of relationship type remained significant,  $\beta = .22$ ,  $SE = .10$ ,  $t(119.27) = 2.31$ ,  $p < .05$ . In other words, there was an idealization effect on partner

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<sup>5</sup> As noted earlier, two partners were independently reporting their interactions so it is impossible to pair up the observations. So this analysis collapsed the interactions within each day into daily measures and compared both partners' daily scores.

disclosure perceptions independent from the partners' self-reported self-disclosure. Hence the idealization effect was supported for perceived partner disclosure. Notably, partner's self-reported self-disclosure also positively predicted perceived partner disclosure,  $\beta = .24$ ,  $SE = .02$ ,  $t(1393.75) = 9.96$ ,  $p < .001$ , indicating that perceived partner disclosure also held a kernel of truth.

*Idealization of partner responsiveness.* Relationship type yielded a significant effect on perceived responsiveness,  $\beta = .23$ ,  $SE = .10$ ,  $t(55.54) = 2.26$ ,  $p < .05$ . LD couples ( $M = 6.16$ ,  $SE = .07$ ) perceived their partners to be more responsive than GC couples ( $M = 5.95$ ,  $SE = .07$ ). Similar to the situation of perceived partner disclosure, it is also necessary to control for the effect of relationship type on self-/partner disclosure that may carry over to perceived partner responsiveness when testing the idealization. This was done by running another LMM analysis on perceived partner responsiveness, including self-disclosure and partner disclosure scores as covariates. Both self-disclosure and perceived partner disclosure significantly predicted perceived partner responsiveness: for self-disclosure,  $\beta = .19$ ,  $SE = .02$ ,  $t(2905.97) = 8.29$ ,  $p < .001$ ; for perceived partner disclosure,  $\beta = .28$ ,  $SE = .02$ ,  $t(2904.72) = 12.02$ ,  $p < .001$ . The relationship type effect became non-significant,  $t(241.39) = 1.40$ ,  $p = .16$ , suggesting that no additional idealization occurred in perceived partner responsiveness. This means that the enhanced responsiveness perceptions for LD couples were driven by the behavioral adaptation in self-disclosures and idealized perceptions of partner disclosures.

*Idealization of intimacy.* As noted above, overall there was a significant effect of relationship type on intimacy, indicating an intimacy enhancement effect. However, this effect disappeared,  $\beta = .04$ ,  $SE = .06$ ,  $t(61.22) = .61$ ,  $p = .54$ , when controlling for the effects of self-disclosure, perceived partner disclosure, and perceived partner responsiveness: for self-

disclosure,  $\beta = .02$ ,  $SE = .02$ ,  $t(2952.65) = 1.02$ ,  $p = .31$ ; for perceived partner disclosure,  $\beta = .10$ ,  $SE = .02$ ,  $t(2940.55) = 5.11$ ,  $p < .001$ ; for perceived partner responsiveness,  $\beta = .63$ ,  $SE = .01$ ,  $t(2987.80) = 43.36$ ,  $p < .001$ . Thus, similar to perceived partner responsiveness, there was no additional idealization of intimacy. This result indicates that the higher intimacy perceptions for LD couples were driven by the behavioral adaptation in self-disclosures and idealized perceptions of partner disclosures.

*Table 4.*

*Means and standard errors for dependent variables across relationship type and media*

		FtF	Phone	Video	Texting	IM	Email
Self-Disclosure (SD)	GC	5.85 <sup>c</sup> (.09)	5.05 <sup>a</sup> (.12)	6.91 <sup>bc</sup> (.62)	5.02 <sup>a</sup> (.09)	5.69 <sup>bc</sup> (.16)	4.95 <sup>ab</sup> (.23)
	LD	6.37 <sup>bc</sup> (.13)	6.07 <sup>b</sup> (.09)	6.39 <sup>c</sup> (.12)	5.79 <sup>a</sup> (.08)	6.09 <sup>bc</sup> (.11)	5.67 <sup>abc</sup> (.25)
Perceived Partner Disclosure (PPD)	GC	5.85 <sup>b</sup> (.08)	5.13 <sup>a</sup> (.12)	6.56 <sup>ab</sup> (.61)	5.11 <sup>a</sup> (.08)	5.64 <sup>b</sup> (.15)	5.36 <sup>ab</sup> (.23)
	LD	6.36 <sup>c</sup> (.13)	6.04 <sup>bc</sup> (.09)	6.32 <sup>c</sup> (.12)	5.80 <sup>a</sup> (.09)	6.00 <sup>abc</sup> (.11)	5.47 <sup>ab</sup> (.25)
Perceived Partner Responsiveness (PPR)	GC	6.09 <sup>b</sup> (.06)	5.71 <sup>a</sup> (.09)	6.58 <sup>ab</sup> (.47)	5.66 <sup>a</sup> (.07)	5.88 <sup>ab</sup> (.12)	5.30 <sup>a</sup> (.18)
	LD	6.50 <sup>b</sup> (.11)	6.14 <sup>a</sup> (.07)	6.44 <sup>b</sup> (.10)	6.15 <sup>a</sup> (.07)	6.16 <sup>a</sup> (.09)	5.80 <sup>a</sup> (.20)
Intimacy (I)	GC	6.01 <sup>c</sup> (.07)	5.53 <sup>b</sup> (.11)	6.66 <sup>bc</sup> (.60)	5.41 <sup>b</sup> (.07)	5.40 <sup>b</sup> (.14)	4.45 <sup>a</sup> (.22)
	LD	6.50 <sup>c</sup> (.14)	6.11 <sup>ab</sup> (.09)	6.33 <sup>bc</sup> (.13)	6.08 <sup>ab</sup> (.09)	5.97 <sup>a</sup> (.11)	5.96 <sup>abc</sup> (.26)

Note: FtF = face-to-face; IM = instant messaging. Means with different superscripts within each row were different.

#### *Intimacy Enhancement across Media*

The third set of hypotheses concerned whether media and their attributes (e.g., cue multiplicity, synchronicity, and mobility) moderate the effects of relationship type on the intimacy process. The omnibus distance x medium interaction effects were significant for most of the dependent variables except perceived partner responsiveness: for self-disclosure,  $F(5,$

2935.91) = 4.24,  $p < .01$ ; for perceived partner disclosure,  $F(5, 2935.27) = 3.72, p < .01$ ; for intimacy,  $F(5, 2884.39) = 2.42, p < .05$ ; and for perceived partner responsiveness,  $F(5, 2876.76) = .94, p = .46$ . These results indicated that the effects of relationship type were not equal across interpersonal media and that media might moderate the effects of behavioral adaptation and perceptual idealization (see Table 4 for means and standard errors across relationship type and media). The following section provides a detailed moderation analysis. The previous LMM analyses that tested behavioral adaptation in self-disclosures and perceptual idealization of three relationship perceptions were re-run for each medium separately, and then for three media contrasts (cue multiplicity, synchronicity, and mobility).

Table 5 presents the effects of behavioral adaptation and perceptual idealization for each medium except for email (the lack of observations disallowed the multilevel analysis for email interactions;  $N_{LD} = 13, N_{GC} = 23$ ).

The behavioral adaptation and perceptual idealization for FtF and phone calls were similar to the overall patterns revealed in the previous analysis (see Table 5). LD couples significantly self-disclosed more than GC couples in FtF and phone calls: for FtF,  $t(64.13) = 2.20, p < .05, \text{Cohen's } d = 1.09$ ; for phone calls,  $t(42.18) = 25.03, p < .001, \text{Cohen's } d = 1.55$ . There was an idealization effect on perceived partner disclosure independent from the partner's self-reported disclosure in both media, for FtF,  $t(48.87) = 3.09, p < .01$ ; for phone calls,  $t(79.80) = 3.25, p < .01$ . However, no additional idealization was found for perceived partner responsiveness (both  $t < .68$  and both  $p > .50$ ) and intimacy perceptions (both  $t < 1.43$  and both  $p > .16$ ).

Texting, on the other hand, also produced significant behavioral adaptation and perceptual idealization effects (see Table 5). LD couples significantly self-disclosed more than

GC couples,  $t(49.53) = 4.00, p < .001$ , *Cohen's d* = 1.09. The idealization of partner disclosure, partner responsiveness and intimacy all achieved significance. Relationship type remained a significant predictor for perceived partner disclosure, perceived partner responsiveness and intimacy when controlling for the carryover effects respectively: for perceived partner disclosure,  $t(110.58) = 3.32, p < .01$ ; for perceived partner responsiveness,  $t(53.32) = 2.49, p < .05$ , *Cohen's d* = .68; for intimacy,  $t(52.66) = 2.33, p < .05$ , *Cohen's d* = .64. That is, unlike the other media, for texting there were uniform idealization effects for the three relationship perceptions, independent from the behavior or carryover effects.

Table 5.

*Effects of behavioral adaptation and perceptual idealization across interpersonal media*

		FtF	Phone Call	Video Call	Texting	IM
Self-Disclosure	GC	5.89(.08)	5.16(.15)	6.79(.74)	5.02(.12)	5.80(.20)
	LD	6.33(.18)*	6.04(.10)***	6.28(.19)	5.70(.12)***	6.06(.14)
	<i>Cohen's d</i>	.55	1.55	.50	1.09	.35
Perceived Partner disclosure	GC	5.92(.07)	5.38(.17)	6.48(.69)	5.17(.09)	5.80(.20)
	LD	6.39(.16)*	5.96(.10)**	6.41(.18)	5.59(.09)**	5.90(.14)
	<i>Cohen's d</i>	.65	.85	.07	.60	.11
Perceived Partner Responsiveness	GC	6.13(.05)	5.97(.11)	6.46(.41)	5.78(.06)	6.03(.16)
	LD	6.21(.12)	6.04(.08)	6.45(.09)	6.01(.06)*	6.14(.11)
	<i>Cohen's d</i>	.30	.16	.03	.68	.20
Intimacy	GC	6.08(.04)	5.83(.12)	6.51(.70)	5.61(.06)	5.74(.16)
	LD	6.22(.10)	5.99(.09)	6.13(.19)	5.83(.06)*	5.91(.11)
	<i>Cohen's d</i>	.18	.32	.34	.64	.28

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

The mean difference between LD and GC on self-disclosure reflects the level of behavioral adaptation, and the mean differences between LD and GC on the three perceptual variables reflect the level of perceptual idealization for each variable. *Cohen's ds* reflect the standardized mean differences between LD and GC.

For video calls and IM, the adaptation effects on self-disclosure were not significant (see Table 5), for video calls,  $t(7.39) = -.68, p = .52$ ; for IM,  $t(35.82) = 1.04, p = .30$ . The effects of

relationship type also did not achieve significance either before or after the carryover effects were controlled for (for video calls, all  $t < -.68$  and all  $p > .52$ ; for IM, all  $t < 1.36$  and all  $p > .18$ ), indicating that no perceptual idealization took place in video calls and IM.

Taken together, the above analysis revealed that behavioral adaptation and perceptual idealization did not operate equally in different interpersonal media. FtF, phone calls and texting interactions led to adaptive self-disclosures and idealized relationship perceptions for LD relationships, while no effects were found for video chat and IM interactions. Among FtF, phone calls and texting, phone calls appeared to produce the largest behavioral adaptation and perceptual idealization on perceived partner disclosure, while texting generated the most uniform effects on all the intimacy components.

What features of these media determine the relative strengths of behavioral adaptation and perceptual idealization across the mixed-mode communications? Rather than looking at how intimacy dynamics operate on separate media, the following section considers media as varying along several continua of attributes and examines how behavioral adaptation and perceptual idealization may vary along these cue multiplicity, synchronicity and mobility.

To accomplish this, media with similar levels of cue multiplicity, mobility and synchronicity were collapsed in the analysis. Three sets of LMM models were fitted on the dependent variables with relationship type and the targeted attribute (cue multiplicity, mobility, and synchronicity) as predictors, controlling for relevant covariates and corresponding behavior or carryover effects<sup>6</sup>. The LMM analyses paid particular attention to the interaction effects of

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<sup>6</sup> The three media attributes are inherently confounded with each other, therefore, their effects on behavioral adaptation and perceptual idealization were analyzed separately to prevent multicollinearity issues.

relationship type and media attributes, which reflect whether the effects of behavioral adaptation and perceptual idealization differed across cue multiplicity, mobility and synchronicity levels.

*Cue multiplicity as a moderator.*

Consider first the dimension of cue multiplicity. The six interpersonal media were roughly categorized as visual-and-audio accessible (FtF and video chat<sup>7</sup>), audio-only (phone calls), and text-based (texting, IM and email). According to H5a and H6a, decreases in cue multiplicity should lead to increases in behavioral adaptation and perceptual idealization, that is, text-based interactions should activate the largest adaptations in self-disclosures and idealizations in relationship perceptions, followed by audio-only and visual-and-audio accessible interactions.

Regarding the behavioral adaptation in self-disclosures, the interaction term of relationship type and cue multiplicity achieved significance on self-disclosure,  $F(2, 2927.99) = 6.07, p < .01$ , suggesting that the adaptation effect was not equal across cue multiplicity (see Table 6 for means and standard errors across types of cue multiplicity and relationship type). Although LD couples reported more self-disclosures than GC couples in all the media (all  $F > 5.37$  and all  $p < .05$ ), the difference between LD and GC was greatest in the text-based interactions (*Cohen's d* = 1.09), followed by the audio-only interactions (*Cohen's d* = .87), and visual-and-audio accessible interactions (*Cohen's d* = .43). That is, consistent with H5a, the fewer cues available, the greater the behavioral adaptation.

*Table 6.*

*Means and standard errors for dependent variables across relationship types and cue multiplicity*

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<sup>7</sup> Ideally, FtF and video chat should be considered as separately because FtF has more nonverbal cues than video chat, such as body gesture. But due to the lack of observations in of video chat ( $n = 101$ ,  $n_{LD} = 97$ ,  $n_{LD} = 3$ ), FtF and video chat interactions were collapsed into one category. Post-hoc analysis (Table 4) also indicated that the dependent variables did not differ between FtF and video chat interactions.

Cue multiplicity		Visual-and-audio	Audio-only	Text-based
Self-disclosure	GC	5.94(.09)	5.12(.12)	5.17(.09)
	LD	6.28(.12)*	5.97(.10)***	5.79(.09)***
	<i>Cohen's d</i>	.43	.87	1.09
Perceived Partner Disclosure (controlled for behavior effect)	GC	5.88(.07)	5.29(.13)	5.34(.08)
	LD	6.28(.14)*	5.92(.08)*	5.81(.07)**
	<i>Cohen's d</i>	.21	.35	.66
Perceived Partner Responsiveness (controlled for carryover effect)	GC	6.07(.05)	5.95(.08)	5.89(.06)
	LD	6.24(.08)	6.04(.06)	6.11(.06)*
	<i>Cohen's d</i>	.15	.13	.60
Intimacy (controlled for both behavior and carryover effects)	GC	5.99(.05)	5.88(.08)	5.76(.05)
	LD	5.99(.08)	5.97(.06)	5.95(.05)*
	<i>Cohen's d</i>	.12	.14	.52

Note: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

The mean difference between LD and GC on self-disclosure reflects the level of behavioral adaptation, and the mean differences between LD and GC on the three perceptual variables reflect the level of perceptual idealization for each variable. *Cohen's ds* reflect the standardized mean differences between LD and GC.

Recall that the idealization of perceptions was reflected by the effect of relationship type on the three perceptual variables after controlling for the behavioral or carryover effects. First, for perceived partner disclosure, the predicted interaction effect of relationship type and cue multiplicity was not significant,  $F(2, 1403.07) = .98, p = .38$ . Relationship type yielded significant main effects for all the groups (all  $F > 6.08$  and all  $p < .05$ ), indicating a uniform idealization effect on partner disclosure (see Table 6): for text-based interactions, *Cohen's d* = .66; for audio-only interactions, *Cohen's d* = .35; and for interactions with visual-and-audio available, *Cohen's d* = .21. The values of *Cohen's d* aligned with the prediction, but the non-significant interaction effect failed to support the moderating effect.

The interaction effect of relationship type and cue multiplicity on perceived partner responsiveness was also not significant,  $F(2, 2801.13) = 1.15, p = .32$ . However, there was some limited support for the predicted moderation. LD couples reported greater partner responsiveness than GC couples in text-based interactions, *Cohen's d* = .60,  $F(1, 73.64) = 6.73, p < .05$ , but LD



and GC couples reported similar partner responsiveness in visual-and-audio and audio-only interactions (both *Cohen's d* < .13, both  $F < .72$  and both  $p > .40$ ), which suggests that the idealization effect on perceived partner responsiveness only occurred in text-based interactions.

For intimacy, there was a significant relationship type x cue multiplicity interaction,  $F(2, 2855.40) = 3.35, p < .05$ , indicating that the effect of relationship type was not equal for three cue multiplicity types. LD and GC couples felt equally intimate in visual-and-audio and audio-only interactions (both *Cohen's d* < .12, both  $F < .79$  and both  $p > .37$ ), but in text-based interactions LD couples experienced more intimacy, *Cohen's d* = .52,  $F(1, 84.86) = 5.82, p < .05$ , indicating the idealization effect on intimacy only took place in text-based interactions.

In sum, consistent with H5a, the above analysis identified cue multiplicity as a moderator for the behavioral adaptation such that self-disclosure adaptation increased as the interpersonal media had fewer cues. The moderating effect of cue multiplicity on perceptual idealization was not fully supported for all the relationship perceptions, but text-based interactions consistently produced larger idealized relationship perceptions than the other two visual or audio available media.

#### *Synchronicity as a moderator.*

The six interpersonal media were grouped into synchronous (FtF, phone calls, video calls), semi-synchronous (IM) and asynchronous (texting and email). It was hypothesized that the decreases in media synchronicity would lead to increases in behavioral adaptation (H5b) and perceptual idealization (H6b) so that behavioral adaptation and perception idealization would be the largest in asynchronous media, followed by semi-synchronous and synchronous media.

As predicted, the interaction effect of relationship type and synchronicity on self-disclosure was significant,  $F(2, 2934.60) = 12.15, p < .001$ , suggesting that the adaptation of self-

disclosure was not equal across media with different synchronicity (see Table 7 for means and standard errors across synchronicity and relationship type). LD couples significantly self-disclosed more than GC couples when communicating with asynchronous media, *Cohen's d* = 1.05,  $F(1, 80.09) = 21.97, p < .001$ ; but LD and GC couples did not differ in the levels of self-disclosure in semi-synchronous and synchronous interactions: for semi-synchronous media, *Cohen's d* = .16,  $F(1, 322.54) = 2.04, p = .15$ ; for synchronous media, *Cohen's d* = .39,  $F(1, 73.78) = 2.88, p = .10$ . In other words, adaptation effect only occurred in asynchronous media.

Table 7.

*Means and standard errors for dependent variables across relationship type and synchronicity*

Synchronicity		Synchronous	Semi-synchronous	Asynchronous
Self-disclosure	GC	5.85(.09)	5.74(.15)	5.09(.09)
	LD	6.08(.10)	6.02(.12)	5.73(.10)***
	<i>Cohen's d</i>	.39	.16	1.05
Perceived Partner Disclosure (controlled for behavior effect)	GC	5.81(.07)	5.67(.16)	5.30(.08)
	LD	6.01(.08)	5.80(.11)	5.73(.08)***
	<i>Cohen's d</i>	.28	.04	.52
Perceived Partner Responsiveness (controlled for carryover effect)	GC	6.05(.05)	5.91(.10)	5.90(.06)
	LD	6.10(.06)	6.05(.08)	6.12(.06)*
	<i>Cohen's d</i>	.15	.13	.61
Intimacy (controlled for carryover effect)	GC	5.97(.05)	5.56(.10)	5.78(.06)
	LD	5.96(.06)*	5.82(.08)*	5.98(.06)*
	<i>Cohen's d</i>	.17	.03	.49

Note: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

The mean difference between LD and GC on self-disclosure reflects the level of behavioral adaptation, and the mean differences between LD and GC on the three perceptual variables reflect the level of perceptual idealization for each variable. *Cohen's ds* reflect the standardized mean differences between LD and GC.

The interaction effects of relationship type and synchronicity on perceived partner disclosure, perceived partner responsiveness, and intimacy all achieved significance: for perceived partner disclosure,  $F(2, 1395.17) = 3.28, p < .05$ ; for perceived partner responsiveness,

$F(2, 2805.62) = 4.87, p < .01$ ; for intimacy,  $F(2, 2863.17) = 7.09, p < .01$ . In other words, the idealization of relationship perceptions was not equal across media with different synchronicity (see Table 7). Pairwise comparisons indicated the following patterns: for perceived partner disclosure, LD couples formed more idealized perceptions when communicating with asynchronous media, *Cohen's d* = .52,  $F(1, 214.23) = 14.55, p < .001$ ; but the idealization of partner disclosure in semi-synchronous and synchronous interactions was not significant, both *Cohen's d* < .28, both  $F > 3.86$ , and  $p > .07$ . The same pattern was found for perceived partner responsiveness. LD couples formed more idealized perceptions than GC couples when communicating with asynchronous media, *Cohen's d* = .61,  $F(1, 81.45) = 7.44, p < .01$ ; but the idealization for synchronous and semi-synchronous media was not significant, both *Cohen's d* < .13,  $F < 1.21$ , and both  $p > .27$ .

For intimacy perceptions, idealization occurred in asynchronous and semi-synchronous media: for asynchronous media, *Cohen's d* = .49,  $F(1, 93.94) = 5.71, p < .05$ ; for semi-synchronous media, *Cohen's d* = .17,  $F(1, 547.46) = 3.95, p < .05$ . The idealization of intimacy did not occur in synchronous media, *Cohen's d* = .03,  $F(1, 80.78) = .02, p = .90$ .

To summarize, as H5d and H6b predicted, behavioral adaptation and perceptual idealization increased as the interpersonal media become more asynchronous. Relative to semi-synchronous and synchronous media, asynchronous interactions consistently generated more adaptation and perception idealization, suggesting that media synchronicity also moderated the effects of relationship type on the intimacy components.

#### *Mobility as a moderator.*

When considering the dimension of media mobility, the mobile phone provides the most capacity in carrying on mobile interactions, followed by computer, and with FtF the least.

Interpersonal media were categorized for mobility as phone calls and texting collapsed as high mobility media, video calls, IM and email collapsed as moderate mobility media, and FtF considered as a low mobility medium. According to H5c and H6c, high mobility media should produce the largest behavioral adaptation and perception idealization, followed by media with moderate and low mobility.

Table 8.

*Means and standard errors for dependent variables across relationship type and mobility*

Mobility		Low	Moderate	High
Self-disclosure	GC	5.94(.09)	5.62(.14)	5.10(.09)
	LD	6.26(.15)	6.09(.11)**	5.84(.09)***
	<i>Cohen's d</i>	.24	.37	1.34
Perceived Partner Disclosure (controlled for behavior effect)	GC	5.89(.07)	5.52(.13)	5.30(.08)
	LD	6.26(.14)*	5.95(.09)*	5.82(.07)
	<i>Cohen's d</i>	.19	.20	.74
Perceived Partner Responsiveness (controlled for carryover effect)	GC	6.06(.05)	5.81(.09)	5.92(.06)
	LD	6.27(.10)	6.11(.07)*	6.09(.06)*
	<i>Cohen's d</i>			
Intimacy (controlled for carryover effect)	GC	5.99(.05)	5.46(.09)	5.83(.05)
	LD	6.05(.10)	5.88(.07)*	5.97(.05)*
	<i>Cohen's d</i>	.22	.50	.32

Note: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

The mean difference between LD and GC on self-disclosure reflects the level of behavioral adaptation, and the mean differences between LD and GC on the three perceptual variables reflect the level of perceptual idealization for each variable. *Cohen's ds* reflect the standardized mean differences between LD and GC.

As predicted in H5c, the interaction term of relationship type and mobility on self-disclosure was significant,  $F(2,2932.04) = 5.90, p < .01$ , suggesting that self-disclosure adaptation was not equal across different mobility groups (see Table 8 for means and standard errors across relationship type and mobility). LD couples significantly self-disclosed more than GC couples when communicating with phones (high mobility) and computers (moderate

mobility): for phone-based interactions, *Cohen's d* = 1.34,  $F(1, 71.93) = 32.13, p < .001$ ; for computer-based interactions, *Cohen's d* = .37,  $F(1, 219) = 7.42, p < .01$ . LD and GC couples did not differ in the levels of self-disclosure in FtF interactions (low mobility), *Cohen's d* = .24,  $F(1, 216) = 3.15, p = .08$ . The comparisons of *Cohen's d* showed that, as predicted, high mobility media produced the largest adaptation effect, followed by media with moderate and low mobility.

The interaction effect of relationship type and mobility on perceived partner disclosure was not significant,  $F(2, 1408.85) = .65, p = .52$ . For high mobility media, *Cohen's d* = .74; for moderate mobility media, *Cohen's d* = .20; and for low mobility media, *Cohen's d* = .19. The pattern of *Cohen's d* indicated that high mobility media produce the largest idealization on perceived partner disclosure, but this pattern was not supported statistically.

The interaction effect of relationship type and mobility on perceived partner responsiveness was also not significant,  $F(2, 2889.81) = .90, p = .41$  (see Table 8). For high mobility media, *Cohen's d* = .32,  $F(1, 70.19) = 4.41, p < .05$ ; for moderate mobility media, *Cohen's d* = .50,  $F(1, 258.92) = 6.81, p < .05$ . In contrast, LD and GC couples reported similar partner responsiveness in low mobility media, *Cohen's d* = .22,  $F(1, 3.17) = .08, p = .79$ .

For intimacy, there was a significant relationship type x mobility interaction,  $F(2, 2876.48) = 4.59, p < .05$ . LD couples experienced more intimacy than GC ones in moderate and high mobility media: for high mobility, *Cohen's d* = .45,  $F(1, 80.66) = 4.18, p < .05$ ; for moderate interactions, *Cohen's d* = .41,  $F(1, 336.97) = 15.01, p < .001$ . In other words, the idealization effects on intimacy occurred in high and moderate mobility media, with roughly similar effect sizes. But LD and GC couples felt equally intimate in low mobility media, *Cohen's d* = .06,  $F(1, 316.55) = .28, p = .60$ .

To conclude, the above analysis suggests that media mobility functioned as a moderator for the behavioral adaptation in such a way that high mobility media produced largest adaptation followed by moderate mobility and low mobility media. On the other hand, there was somewhat mixed support for the predicted moderation on perceptual idealization. Specifically, low mobility media consistently produced no or the smallest idealization while the idealization effects were significant for moderate and high mobility media.

#### *Auxiliary Results*

*Gender.* Males and females did not differ on the pre-existing relationship characteristics (relational uncertainty, relationship satisfaction and relationship commitment), and three of the four dependent variables: self-disclosure, perceived partner disclosure, and intimacy. Gender had a significant effect on perceived partner responsiveness when controlling for relationship characteristics, interaction quantity, self-disclosure and partner disclosure (either partner's self-report or perceived partner disclosure),  $t(60.92) = 2.22, p < .05$ . Females ( $M = 6.10, SE = .04$ ) generally reported greater partner responsiveness than males ( $M = 5.99, SE = .04$ ), regardless of their own disclosure behaviors and their boyfriends' disclosure behaviors.

*Relational uncertainty* was negatively associated with perceived partner responsiveness when controlling for gender, other relationship characteristics, interaction quantity, self-disclosure and partner disclosure (either partner's self-report or perceived partner disclosure),  $\beta = -.10, SE = .05, t(123.67) = -2.08, p < .05$ . Individuals who felt more certain about the relationship were more likely to perceive their partner as responsive, regardless of the actual behaviors.

*Relational commitment* positively predicted intimacy when controlling for gender, other relationship characteristics, interaction quantity, self-disclosure and partner disclosure,  $\beta = .08,$

$SE = .04$ ,  $t(131.94) = 2.07$ ,  $p < .05$ . That is, individuals who were more committed to the relationship were more likely to experience intimacy in the interaction.

## CHAPTER 7

### DISCUSSION

The primary goal of the present study was to examine how geographical separation and interpersonal media (e.g., email, phone, texting, etc.) affect the intimacy process in LD dating relationships on an interaction-by-interaction basis. Although distanced relationships maintained via a mix of interpersonal media are commonplace nowadays, there is little research on intimate relating in the LD or mixed-mode settings. Drawing on the interpersonal process model of intimacy (IPMI; Reis & Shaver, 1988), the present study examines the intimacy dynamics in LD versus GC dating relationships with a novel web-based diary method. It particularly looks at how geographic separation activates behavioral adaptation in self-disclosures and idealization of relationship perceptions for the pursuits of intimacy. The study further probes for the role of interpersonal media in producing adaptive self-disclosures and idealized relationship perceptions.

The present study offers three main theoretical contributions for understanding the communication and relational processes in LD relationships. First, this study is the first to empirically test the IPMI model in the LD relationship context. By using reports of daily interactions from LD and GC dating couples, the study's results support the central predictions of the IPMI in both LD and GC groups, suggesting that the IPMI can account for intimacy dynamics in the LD context.

Second, this study is the first to use the diary method to scrutinize specific interactions in LD relationships, and it replicates and extends the relational positivity of LD dating observed in previous questionnaire studies by showing that LD couples generally experienced greater intimacy relative to GC couples on an interaction-by-interaction basis. Drawing on the IPMI framework, the current investigation identifies a dynamic relational process in LD dating in



which LD couples seek to enhance intimacy via the routes of behavioral adaptation and perceptual idealization. Specifically, relative to GC participants, LD dating participants adapted their communication behaviors by making more self-disclosures, and also formed more idealized perceptions of their partner's disclosure behaviors, leading ultimately to more intimate relating states.

Finally, the current work explores the role of interpersonal media in ongoing relationships that take place in geographically close and distant contexts. The results suggest that the interpersonal medium in which the interaction took place can moderate the effects of behavioral adaptation and perceptual idealization in LD interactions. While these findings have offered some support for the media effects predicated by traditional CMC theories, they also imply several substantial differences between exclusively online and mixed-mode relationships. The following sections consider each of these contributions in turn.

It is also noteworthy to mention that the present study offers detailed descriptions of communication patterns in dating relationships, including how frequently the couples interact each day, how long the interactions are, and what interpersonal media they use. Such a descriptive work is often called for as a suggestion for future research, but is less often done by the scholars because it is frequently seen as atheoretical and trivial (Duck et al., 1991). However, as several communication theorists suggest (Hindi, 1981; Cappella, 1988), descriptive nuances of interaction patterns are of great importance for the comprehension of the commonplace and for tracking the continuous graphs of human interactions. For similar reasons, by providing a comprehensive understanding of the daily interactions in both LD and GC dating groups, the current study also contributes to a fuller picture of communication proclivities that are carried out at a distance and via a number of interpersonal media.

### *Extending the IPMI to Long-Distance Dating*

The first goal of the current study is to extend the IPMI framework from GC to LD relationship contexts. The data provide support for the central tenets of the IPMI model, which represents a replication for GC couples but a novel finding for LD couples and an important extension to the IPMI model. Specifically, for both GC and LD relationships, both self-disclosure and partner disclosure within an interaction predicted ratings of intimacy, and such effects were mediated by the perceptions of partner responsiveness, indicating that perceived partner responsiveness was a more proximal predictor for the creation of intimacy relative to self- and partner disclosures. These results indicate that the IPMI framework, although originally developed to explain and predict the intimacy process in co-present relationships and interactions, can sufficiently capture the intimacy dynamics in distanced relationships.

While the basic structure of the IPMI model held for both LD and GC groups, the data also revealed that geographic separation magnifies the effect of the central mediation component predicted by the IPMI. The mediational relation of self-disclosure → perceived partner responsiveness → intimacy was stronger for LD than for GC couples. Specifically, for LD couples, self-disclosure only created intimacy when the discloser felt the disclosure was understood, valued and supported by the partner. This finding suggests that, relative to GC participants, the intimacy LD participants experience in their interactions is more dependent on the perceptions of being understood, validated, and cared for by their partners.

The more important role of perceived partner responsiveness in LD relationships aligns with previous research on the rewards and incentives associated with maintaining LD relationships (Parks & Floyd, 1996; Johnson, Haigh, Becker, Craig, & Becker, 2009). People receive different benefits from LD and GC relationships, which provide reasons for maintaining both types of interactions. For example, LD friendships focus more on the mutual understanding

and trust between two persons while GC friendships value practical help more and consider “being there” when needed as an important feature of close friendship (Fehr, 2004). Similarly, in the case of romantic relationships, LD partners usually live too far away to provide instrumental help (e.g., offer a ride). Instead, LD lovers are valued for their capability in providing special insight, empathy or understanding. Perceiving the partner as responsive increases the perceived worthiness of maintaining the LD relationship (e.g., “I’m dating the right person”), and such a secure feeling helps attenuate the distress and uncertainty associated with LD dating. By the same token, unresponsive partner perceptions create relationship dissatisfaction because the individual may feel the high costs for maintaining the LD relationships do not bring subjective rewards.

The study also adds to our understanding of the transformation process whereby relationship characteristics and interactions mutually influence each other over time by considering how the contextual nature of a relationship may transform specific interactions. While previous studies have largely focused on the mutual transformation between pre-existing personal and relationship qualities (e.g., interpersonal goals, attachment styles, relationship stage) and specific interactions, this study shows that geographic separation can also transform specific interactions. The LD status activates openness and responsiveness in communication, and also biases the interpretations to represent the partner as open and responsive. The adaptive disclosure behaviors and idealized relationship perceptions arising from the interactions contribute to increased momentary intimacy and potentially greater relationship satisfaction and stability over time. Future research is required to examine this mutual and potentially self-perpetuating transformation process by obtaining longitudinal observations over the intimacy process.

### *Intimacy Enhancement in Long-Distance Dating*

While previous studies consistently document that LD dating relationships can equal or even exceed the relationship satisfaction and intimacy that occur in GC dating relationships (Maguire & Kinney, 2010), there has been limited research explaining how the positive relating states are created in LD dating with limited amounts of day-to-day communication. One of the exceptions is the recent work on intimacy-focused communication (Carsensen et al. 1999; Sahlstein, 2004; Stephen, 1986; Stafford, 2010; Stafford & Merolla, 2007), which argues that adaptive communication for distance constraints and pronounced relational idealization contribute to the creation of relational positivity in LD dating. Some cross-sectional data are aligned with this explanation, for example, compared to GC participants, LD participants are found to enact more rewarding communication styles (Stafford, 2010) and form more idealized representations of partners and relationships (Stafford & Merolla, 2007).

By obtaining repeated self-reports from both LD and GC couples over a week, the study provides new evidence for an intimacy enhancement process in LD dating. It bears noting that such adaptation and idealization effects were independent of any pre-existing relationship characteristics, such as relationship length, relational uncertainty, relationship satisfaction and commitment. Hence, the possibility that pre-existing relational confounds drive the differences between LD and GC is unlikely.

The intimacy enhancement process observed here advances our understanding of LD relationships in two critical ways. First, the present study extends prior theorizing of intimacy-focused communication with more precise understandings of how LD couples strategically adapt relational communication and relationship perceptions at the level of specific interactions. Such precision is also achieved by controlling for within-dyad effects in the analyses. While most existing LD relationship research has focused on only one member of the couple, this study

collects reports of daily interactions from both members. Idealization of partner disclosure, for example, was assessed by controlling for the partner's self-reported behaviors. Such dyadic measures provide better accuracy than the idealization scales used in previous cross-sectional studies (Stafford & Merolla, 2007).

The diary study method also permitted the observation of several other behavioral dynamics that would not be picked up by cross-sectional data. For example, previous cross-sectional observations indicate that LD couples have less frequent FtF contact but no more frequent mediated communication (Stafford & Merolla, 2007). The present study reveals that, indeed, compared to GC couples, LD couples had fewer interactions overall, but they relied on more mediated interactions (except for email) and lengthier interactions in FtF, phone call, video chat and texting, suggesting an adaptation effect where restraints on the frequency of communication is made up for by longer interactions. This adaptation to distance limits with longer interactions is consistent with the Social Information Processing Theory (Walther, 1992), which suggests that effective interpersonal communication can be reached when enough time is given to message exchange.

More importantly, by drawing on the IPMI framework, the present study introduces a dyadic and process-based model to understand how LD relationships produce intimacy enhancement. In contrast with previous research that treats relational idealization as a LD relationship state, the present study identifies a dynamic process of idealization. Specifically, relational idealization was not a uniform effect that occurred in all relationship perceptions. Instead, LD participants only idealized the perceptions of the partners' disclosure behaviors, and this idealization carried over to more general relationship perceptions, such as perceived partner responsiveness and intimacy. In doing so, the findings lend new support to the behavioral

idealization mechanism, which argues that idealization is driven by over-interpretation of the selective presented images in restricted communication (Stafford & Merolla, 2007).

The results argue against the uncertainty reduction account of idealization (Stafford & Merolla, 2007), which claims that LD couples form positive illusions to ward off heightened relational uncertainty. In contrast to this prediction, LD and GC participants scored equally on overall relational uncertainty when relationship length and stage were controlled for, and LD participants even felt more certain about the future of the relationship than GC participants. The uncertainty reduction explanation is further challenged by the negative association between relational uncertainty and perceived partner responsiveness. In other words, feeling certain, rather than uncertain, about the relationship promoted more idealized perceptions of partner responsiveness. This result seems more aligned with a projection process whereby individuals projected their own chronic relational certainty onto the perceptions of the specific responses they received from their partners, but this explanation needs further development and testing in future research. Future research should also rethink and empirically test the widely held but seldom tested proposition that LD status increases relational uncertainty. The present study, together with previous work (see Maguire, 2007) showing that LD couples may not experience relational uncertainty if they do not see reunion as a desirable outcome, has presented some counter evidence for the assumed increase in relational uncertainty in LD dating.

#### *The Role of Interpersonal Media in Intimacy Enhancement*

Another goal of the present study was to explore how interpersonal media play a role in the intimacy enhancement process in LD dating. The findings have provided some initial evidence for interpersonal media's effect on the processes of behavioral adaptation and perceptual idealization. Specifically, LD participants consistently self-disclosed more and

formed more idealized relationship perceptions in FtF, phone call and texting while such differences in behaviors and perceptions did not occur in video chat, IM and email.

The study further categorized interpersonal media along the continuous dimensions of cue multiplicity, synchronicity and mobility for cross-media comparisons. The results provide strong evidence for the moderating effects of these categories in the context of behavioral adaptation. LD participants engaged in more self-disclosures relative to GC participants as the communication medium became more text-based, asynchronous, and mobile. The moderation on perceptual idealization, on the other hand, only received limited support, with text-based, asynchronous, and mobile interactions consistently producing relative large idealizations on relationship perceptions.

The current investigation provides some converging support for the media effects predicated by traditional CMC theories in a mixed-mode setting. The findings replicate the predictions of several CMC theories that when the interactions move from FtF to text-based, asynchronous environments, the need for effective interpersonal exchange activates adaptive communication behaviors (e.g., selective self-presentation, uncertainty-reducing strategies; Walther, 1992, 1996; Walther & Bazarova, 2008) and also leads to intensified, usually idealized interpersonal perceptions (e.g. overattributions; Walther, 1996).

More importantly, the communication adaptation and idealization effects may extend to other constrained media situations, for example, interstitial situations in which individuals have very limited time for communication due to high mobility. Mobility, a novel media attribute that reflects the ability to support interstitial interactions during transit in space and time, was found to moderate the intimacy enhancement process. The behavioral adaptation in self-disclosures increased as the mobility of interpersonal media increased, and high mobility media (phone-

based media) consistently produced idealization effects on relationship perceptions. These findings further shed light on how interpersonal media may be conceptualized in other ways instead of in terms of technical properties as most traditional media theories have done. Mobility, on the other hand, is able to capture some gratification concerns that arise from a variety of time, space and social constraints (Dimmick et al., 2011), for instance, the concern of exploiting gaps between daily routines when or where other more traditional media are unavailable and inappropriate for communication.

Based on these findings, it is clear that both distance and interpersonal media matter for creating intimacy in LD dating. At this point, an intuitive question one may ask is which factor, distance or media, matters more. The moderation of interpersonal media on the intimacy enhancement suggests the effects of LD status outweighed the media effects because LD participants consistently reported greater intimacy than GC counterparts and the medium only affected the magnitude of such differences. For instance, Table 4 indicates that FtF interactions still produced greater overall intimacy than text-based interactions (texting, IM and email), although greater adaptation and idealization indeed occurred in text-based media.

This finding, however, contradicts the prediction of Hyperpersonal model (Walther, 1996) that CMC creates greater overall intimacy relative to FtF via several concurrent cognitive and communication processes relating to message construction, interpretation and feedback. Such a contradiction suggests that there may be some substantial differences between exclusively online and mixed-mode settings. For instance, feedback may be a crucial factor that affects the relative strengths of idealization in different settings. In exclusively online relationships, as the Hyperpersonal model reasons, the receiver may idealize the sender based on selectively presented messages and respond in such a way that confirms and reinforces the ideals (Walther,



2010). In contrast, in mixed-mode relationships, for example in the case of LD relationships, the idealization states developed in text-based only interactions may be diluted or disconfirmed by the visual and aural cues in the subsequent FtF interactions.

Another factor that distinguishes exclusively online relationships and the mixed-mode relationships observed in the present study is the effect of having alternative media. According to the Electronic Propinquity Theory, the availability of alternative media should decrease the levels of behavioral adaptation (Walther & Bazarova, 2008). Individuals with no media choices are likely to accommodate their communication as much as they can, which might explain why previous experimental studies that assign participants into either text-based CMC or FtF interactions observe greater CMC intimacy. In contrast, as shown in this study, Both LD and GC couples used about two different media each day, indicating that dating partners in natural media settings are likely to have available choices of alternatives. Therefore, when facing a constrained media situation, they may simply choose to migrate to a less constrained situation (e.g., switch from texting to later phone call) rather than behaviorally adapt to the constraints.

### *Limitations*

The findings discussed above are encouraging, but several limitations of the current study need to be addressed. First, strict causality about the relationships among intimacy components cannot be determined due to the non-experimental nature of the study. For example, the IPMI posits effects from self-/partner disclosure and partner responsiveness to intimacy, but it is also possible that greater intimacy triggers greater disclosures and responsiveness in behaviors and further enhances the whole intimacy process. Theoretically this model is self-perpetual with repeated interactions over time, but a week's study period may not have been able to capture this dynamic. Future research is required to examine this mutual and self-perpetuating transformation

process by obtaining longitudinal observations over the intimacy process. Another methodologically-related issue is that participants may become more aware of their communication behaviors and start to monitor the interaction with the partner; therefore, the self-reported interactions may not reflect the normal communication patterns in daily interactions. They may also be motivated to report desirable interactions and conceal conflicts in both diary reports and interaction records to protect the image of the relationship.

Second, the generalizability of the findings from this study may be limited to the sample population. As discussed in the introduction, there are significant in-group differences among LD romantic relationships. LD couples vary drastically in terms of relationship stage (e.g., casual committed, married with children) reasons for separation (e.g., dual educational, professional pursuits, military deployment, incarceration, and illegal migration), and communication behaviors (e.g., living 50 miles apart and living in two different countries) (Merolla, 2010). Caution should be given when generating the results of the present study to other groups of LD relationships, such as married couples. Martial relationships, compared to dating relationships, may have less fluctuation in the intimacy dynamics and responsiveness may play a more central role given that married couples have already established high levels of mutual understanding. Future research needs to examine how the IPMI model operates differently across LD relationship types.

Finally, similar to previous empirical testing of the IPMI model, this study also demonstrated a high correlation between perceived partner responsiveness and intimacy consistently, which suggests that these two concepts share some key commonalities with each other. While the IPMI considers them as two interrelated but distinct constructs, the discriminant dimension of perceived partner responsiveness and intimacy remains understudied. One

speculation is that the psychological intimacy (the target of the present study) and perceived partner responsiveness may significantly correlate, especially in verbal-based relational processes, but physical intimacy (e.g., sex) may not have such a relationship with perceived partner responsiveness. Future research is called for to explicate the relationship between these two concepts in various relational processes.

### *Conclusion*

The current study contributes to our understanding of how close relationships are maintained at a distance via a wide range of interpersonal media in a few important ways. It provides a more dynamic analysis of daily romantic interactions, and also offers contextual extension to the Interpersonal Process Model of Intimacy in the context of long-distance romantic relationships. It further proposes and tests an intimacy enhancement process in which long-distance romance creates intimacy via two concurrent cognitive and communication processes and explicates how such a process may operate differently along a number of interpersonal media. The type of descriptive work helps map out the nuances of the mixed-mode, everyday communication because more of our relationships are at a distance and carried out by various interpersonal media.

## APPENDIX 1

### DIARY TUTORIAL MATERIALS

#### 1. DIARY INSTURCTIONS

*What is an interaction?*

- 1) An interaction is any communication (of any length) in which you and your partner exchange messages.
- 2) An interaction normally has some conversation themes, such as accomplishing joint tasks (e.g., planning dinner), sharing information and experience (e.g., talk about sports), and facilitating the relationship (e.g., express love).

Interactions are different in different media. We are going to help you to identify interactions for each medium.

*What counts as a face-to-face interaction?*

- 1) It happens in physically close locations.
- 2) Two partners are taking to each other (Sitting together watching a movie without talking is not an interaction)
- 3) Short breaks do not matter (If your partner went to the bathroom and came back to continue the conversation, it still is a conversation)

*What counts as a phone call interaction?*

- 1) Usually one phone call is one interaction.
- 2) Please exclude voicemails
- 3) Short phone calls can be grouped as one interaction if they're about the same theme (e.g., schedule a pickup)
- 4) We suggest you check your call log for better accuracy

*What counts as a video call interaction?*

- 1) Conducted via video-call software (e.g., Skype, Gtalk, MSN)
- 2) At least one of you had video display
- 3) Calling landlines and mobiles with video-call software is counted as phone call interactions

*What counts as a text messaging (SMS) interaction?*

- 1) Each partner contributes at least one message
- 2) The talk focuses on one main theme (e.g., planning dinner)

- 3) Delay in responses doesn't matter as long as the message is responding to a previous one (You went to the gym and didn't see your partner's message until 2 hours later, but you still replied the message - This is one interaction)
- 4) Text messages are usually threaded so that you can easily retrieve your interaction with your partner. If your phone doesn't provide threaded SMS, you may want to go through the messages you sent and messages you received from your partner.

*What counts as an instant messaging (IM) interaction?*

- 1) Each partner contributes at least one message
- 2) An interaction ends when one partner leaves the conversation (e.g., TTYL: talk to you later)
- 3) Short pauses in the chat doesn't matter (e.g., BRB: Be right back)
- 4) Instant chat in Facebook should be counted in this category

*What counts as an email interaction?*

- 1) A threaded email with both partners contributing at least one message
- 2) Different threads should be counted separately
- 3) Categorize Facebook messages (including both wall post and private messages) here because they are also text-based, asynchronous in nature

## 2. SAMPLE SCENARIOS

1) You two are having a text message conversation about last night's episode of Friends on TV and your partner goes to a test and must ignore his/her phone for an hour and a half. He/she looks at his phone an hour and a half later and responds to your last response. Is this a new interaction, or part of the same one?

- ANSWER: Same topic over text message means SAME INTERACTION.

2) You two are in the same social space (example: at a bar) but do not have any sort of conversation for whatever reason. Is this an interaction?

- ANSWER: No, no discussion means no interaction.

3) You two are watching a movie together and you have a discussion before the movie, then watch intently, and then have a follow up conversation about the movie. Are these two conversations the same interaction?

- ANSWER: Yes, same topic.

4) You two are watching a movie together and have a discussion before the movie. After the movie your partner must leave for work for 2 hours. Upon his/her arrival back, you two discuss the movie. How many interactions is this?

- ANSWER: Two separate interaction.

5) You two are video chatting and your partner gets a phone call and must leave the room for two minutes to take the call. Upon his/her arrival you continue to chat. Is this a new interaction?

- ANSWER: No, brief pause with return counts as same interaction.

6) You two are on Skype, and it crashes. You must reboot your computers to return to the conversation. Is this one or two interactions?

- ANSWER: One interaction

7) You two are on Skype and you must leave to go to the gym. Upon your arrival one hour later you return to your conversation on Skype. One or two interactions?

- ANSWER: Two different interactions.

8) Your partner wakes up and texts “Miss you” to you who then responds “Same!” The conversation ends and no more talking goes on for the rest of the day. Is this simple two-line conversation an interaction?

- ANSWER: Yes, interaction involves both sides saying at least one thing.

Often, different scenarios that we have not discussed will occur and it will be tricky as far as whether there is a new interaction or not. Just go with your instincts and if it feels like the same interaction, then go with that.

## APPENDIX 2

### DIARY MEASURES

1. This interaction happened via:

- 1) Face-to-face
- 2) Phone call
- 3) Video call
- 4) Text messaging
- 5) Instant messaging
- 6) Email (including FaceBook messages)

2. How long did this interaction last? (for face-to-face, phone call, video call)

- 1) < 15 mins
- 2) 15-30 mins
- 3) 30-45 mins
- 4) 45-60 mins
- 5) 1-1.5 hours
- 6) 1.5-2 hours
- 7) More than 2 hours

3. How many messages in total did you two exchange in this interaction? (Text messaging, Instant messaging and Email)

- 1) less than 3
- 2) 3-5
- 3) 6-10
- 4) 11-15
- 5) 16-20
- 6) More than 20

4. Below is a list of items that describe your interaction with your romantic partner. Using the scale below, please rate to what extent each item describes this interaction (Laurenceau et al., 2005).

- 1) I shared personal experience and thoughts during this interaction.
- 2) I told my partner about my personal feelings or emotions.
- 3) My partner shared experience and thoughts during this interaction.
- 4) My partner told me about his/her personal feelings or emotions.
- 5) My partner understood what I said.
- 6) My partner gave positive comments toward what I said.
- 7) My partner expressed caring for me during the interaction.
- 8) I feel close to my partner following this interaction.

## APPENDIX 3

### GLOBAL RELATIONSHIP MEASURES

#### Relationship Background

1. How long have you and your partner been dating? (in months)
2. Which stage best describes your current dating relationship?
  - 1) Casual (seeing each other sporadically, sharing superficial information, uncertain about the future of the relationship)
  - 2) Somewhat Serious (increased interaction, affection, dependence on each other)
  - 3) Serious (feeling of trust, attraction, love, interdependence)
  - 4) Committed (intense feeling of love, serious plans for the future)
3. How long have you and your partner been long distance (in months)? (For long-distance couples only)
4. For what reason you and your partner become geographically separated? (For long-distance couples only)
  - 1) Job
  - 2) Family
  - 3) School
  - 4) Other (please specify) \_\_\_\_\_
5. How many miles are between your place and where your partner lives (in miles)? For long-distance couples only)
6. Approximately how often do you see each other? For long-distance couples only)
  - 1) Very rare or Never
  - 2) Less than Once a Month
  - 3) Once a Month
  - 4) 2-3 Times a Month
  - 5) Once a Week
  - 6) 2-3 Times a Week

#### Relationship Assessment Scale (RAS; Hendrick, 1988)

- 1) How well does your partner meet your needs?
- 2) In general, how satisfied are you with your relationship?



- 3) How good is your relationship compared to most?
- 4) How often do you wish you hadn't gotten in this relationship?
- 5) To what extent has your relationship met your original expectations:
- 6) How much do you love your partner?
- 7) How many problems are there in your relationship?

Relationship commitment scale (Rusbult, Martz, & Agnew, 1998)

- 1) I want our relationship to last for a very long time (please circle a number).
- 2) I am committed to maintaining my relationship with my partner.
- 3) I would not feel very upset if our relationship were to end in the near future.
- 4) It is likely that I will date someone other than my partner within the next year.
- 5) I feel very attached to our relationship-very strongly linked to my partner.
- 6) I want our relationship to last forever.
- 7) I am oriented toward the long-term future of my relationship (for example, I imagine being with my partner several years from now).

Relational Uncertainty Scale (RUS; Knobloch & Solomon, 1999)

How certain are you about.....

*(Definition of the relationship)*

- 1) how you and your partner would describe this relationship
- 2) the state of the relationship at this time?
- 3) whether or not this is a romantic or platonic relationship?

*(Mutual understanding)*

- 4) whether or not you and your partner feel the same way about each other?
- 5) whether or not your partner likes you as much as you like him or her?
- 6) whether or not you and your partner will stay together

*(Future of the relationship)*

- 7) the future of the relationship?
- 8) where this relationship is going?
- 9) what you can or cannot say to each other in this relationship?

*(Norms of the relationship)*

- 10) the boundaries or appropriate and/or inappropriate behavior in this relationship?
- 11) the norms of this relationship?
- 12) how you and your partner view this relationship?

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